Operator's Manual

Ventrac 4500K
Ventrac 4500P
Ventrac 4500Y
Ventrac 4500Z

by Venture Products Inc.

VENTRAC® MOUNT SYSTEM

Revised 02/18/13
09.10081

500 Venture Drive
PO Box 148
Orrville Oh 44667
www.ventrac.com

To the Owner
Contact Information and Product Identification

If you need to contact an authorized Ventrac dealer for information on servicing your product, always provide the product model and serial numbers.

Please fill in the following information for future reference. See the picture(s) below to find the location of the identification numbers. Record them in the spaces provided.

Date of Purchase: _____

Dealer: _____

Dealer Address: _____

_____

Dealer Phone Number: _____

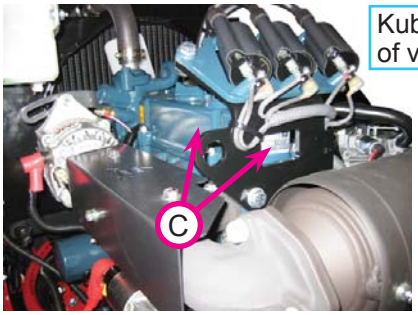
Dealer Fax Number: _____

Model # (A): _____

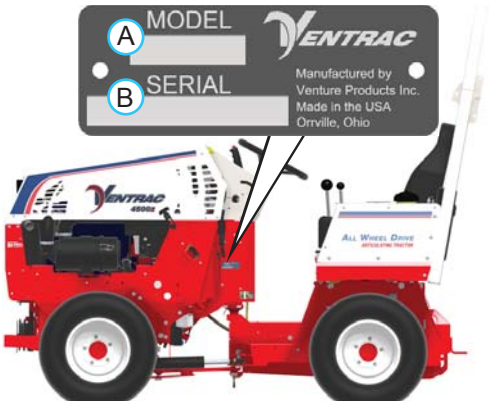
Serial # (B): _____

Affix Part/Serial Number label here.

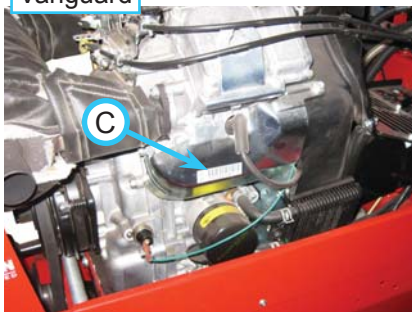
Engine Serial # (C) _____



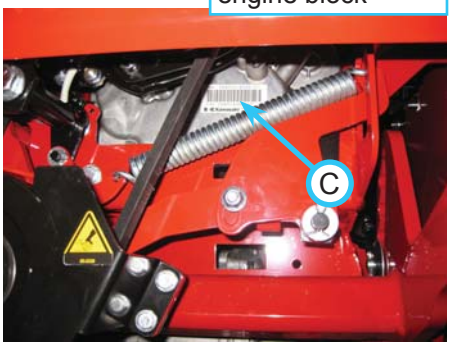
Kubota - front or side of valve cover



Vanguard



Kawasaki - front of engine block



Venture Products Inc. reserves the right to make changes in design or specifications without obligation to make like changes on previously manufactured products.

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INTRODUCTION

Venture Products Inc. is pleased to provide you with your new Ventrac power unit! We hope that Ventrac equipment will provide you with a ONE Tractor Solution.

Listed below are just some of the items that can provide you *versatility* as you use your 4500. Please visit our web site, or contact your authorized Ventrac dealer for a complete list of items available for your new power unit.

Accessories	Item Description	Part Number
	Three Point Hitch	70.4100
	Dual Wheels (All Terrain Tires)	70.4067
	Dual Wheels (Turf Tires)	70.4068
	Dual Wheels (Bar Tires)	70.4069
	Wheel Extensions	70.4098
	Weather Cab	70.2009
	Propane Kit (4500Z Kubota Gas Engine only)	70.4110
	Foot Control Kit	70.4107
	Suspension Seat	70.4111
	Backup Alarm Kit	70.4101
	Front Hitch Valve Kit	70.4121
	Work Light Kit	70.4113
	Strobe Light Kit	70.4114
	Directional / Hazard Signal Kit	70.4119
	Slope Indicator Kit	70.4112

Accessories	Item Description	Part Number
	Weight Transfer Kit (4500K only)	70.4115
	4500K Accessory Option Kit (Factory Install only)	70.4116-99
	Raised Foot Platform Kit	70.4108
	Electric PTO Remote Kit	70.4106
	12 Volt Front Kit	70.4104
	12 Volt Rear Kit	70.4105
	Horn Kit	70.4120
	ES220 Spreader	39.55500
	SS575 Salt Spreader	70.2010
	Rear Counter Weight Bar	39.56116
	Two -N-One Front Hitch	70.2001

Attachments	Item Description	Part Number
	Aerator with Open Spoon Tine	39.55490
	Aerator with Slitter/Slicer Tine	39.55492
	Aerator with Coring Tine	39.55494
	AeraVator (seeder kit available)	39.55460
	Blade - 48”	39.55251
	Blade - 60”	39.55252
	Blade - 72”	39.55253
	Blower	39.55440
	Broom	39.55400
	Edger	39.55330
	Excavator - 30”	39.55236
	Excavator - 48”	39.55230
	Finish Mower - 60”	39.55105
	Finish Mower - 72”	39.55106
	Finish Mower - 72” (6-1/2” offset)	39.55107
	Generator - 15,000 Watt	39.55315
	Power Rake	39.55435
	Slip Scoop - 30”	39.55216
	Slip Scoop - 48”	39.55210
	Snow Blower	39.55427
	Sod Cutter	39.55520

Attachments	Item Description	Part Number
	Stump Grinder	39.55300
	Terra Rake - 52”	39.55431
	Tiller	39.55220
	Tough Cut Mower - 68”	39.55104
	Trencher	39.55455
	Turbine Blower	39.55340
	V-Blade	39.55271
	Versa-Loader	39.55600
	Reel Mower - 74”	39.55130
	Rear Discharge Mower - 60”	39.55120
	Contour Mower - 84”	39.55160

Product Description

The Ventrac 4500 tractor combines All Wheel Drive and an articulating chassis with a low center of gravity to provide superior traction, braking, stability, and security on tough terrain and slopes without disturbing turf when turning. The attachment is placed out front in natural view, offering greater precision, as well as maximum protection for the operator.

Ventrac's patented SDLA control, located next to the operator, allows for easy control of Speed, Direction, Lift, and Auxiliary functions with one hand.

Standard features include:

- a fold down roll bar.
- a computer controlled onboard diagnostic system for the electrical circuits.
- a wiring harness that is pre-wired for optional accessories.
- an electronic instrument panel that includes a tachometer, speedometer, fuel gauge, hour meter, and temperature gauge.
- a six function warning gauge and alarm that includes engine coolant temp, hydraulic oil temp, engine oil temp, low voltage, low engine oil pressure, and parking brake indicator.
- a complete electrical system circuit breaker and battery disconnect.
- an automotive pull style park brake.
- a hydraulic oil cooler with a thermostatically controlled, reversible fan.

Why Do I Need an Operator's Manual?

This manual has been created to help you gain the important knowledge of what is needed to safely operate, maintain, and service your machine. It is divided into sections for convenient reference of the appropriate section.

You must read and understand the operator's manual for each piece of Ventrac equipment you own. Reading the operator's manual will help you become familiar with each specific piece of equipment. Understanding the operator's manual will help you, as well as others, avoid personal injury and/or damage to the equipment. Keep this manual with the machine at all times. The manual should remain with the machine even if it is sold. If this manual becomes damaged or unreadable, it should be replaced immediately. Contact your local Ventrac dealer for a replacement.

When using a Ventrac attachment, be sure to read and follow the safety and operating instructions of both the power unit and the attachment being used to ensure the safest operation possible.

The information in this manual provides the operator with the safest procedures to operate the machine while getting the maximum use out of the unit. Failure to follow the safety precautions listed in this manual may result in personal injury and/or damage to the equipment.

INTRODUCTION

Using Your Manual

Throughout this manual, you will encounter special messages and symbols that identify potential safety concerns to help you as well as others avoid personal injury or damage to the equipment.

SYMBOL DEFINITIONS

ATTENTION

This symbol identifies potential health and safety hazards. It marks safety precautions. Your safety and the safety of others is involved.

There are three signal words that describe the level of safety concern: Danger, Warning, and Caution. Safety should always be the #1 priority when working on or operating equipment. Accidents are more likely to occur when proper operating procedures are not followed or inexperienced operators are involved.

Note: Right-Hand and Left-Hand orientations may be referred to at different places throughout this manual. Right-Hand and Left-Hand is determined as if sitting on the power unit seat facing forward.

SIGNAL WORD DEFINITIONS

⚠ DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme cases.

⚠ WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or property damage. It may also be used to alert against unsafe practices.

Manual Glossary

Power Unit A Ventrac tractor or other Ventrac engine powered device that may be operated by itself or with an attachment or accessory.

Attachment A piece of Ventrac equipment that requires a Power Unit for operation.

Accessory A device that attaches to a Power Unit or Attachment to extend its capabilities.

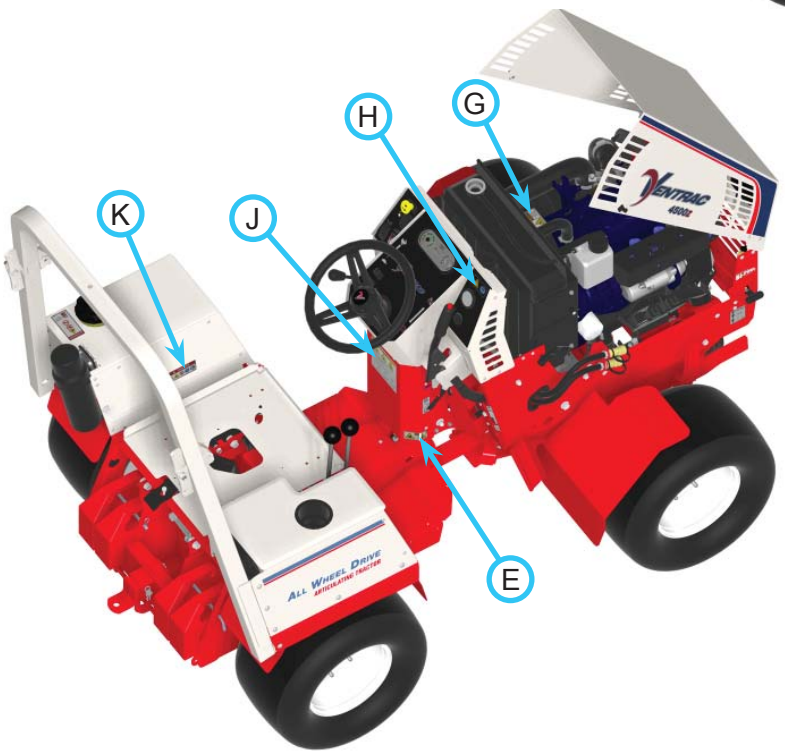
Machine Describes any “Attachment” or “Accessory” that is used in conjunction with a power unit.

Safety Decals

The following safety decals must be maintained on your Ventrac 4500 power unit.

Keep all safety decals legible. Remove all grease, dirt, and debris from safety decals and instructional labels. If any decals are faded, illegible, or missing, contact your dealer promptly for replacements.

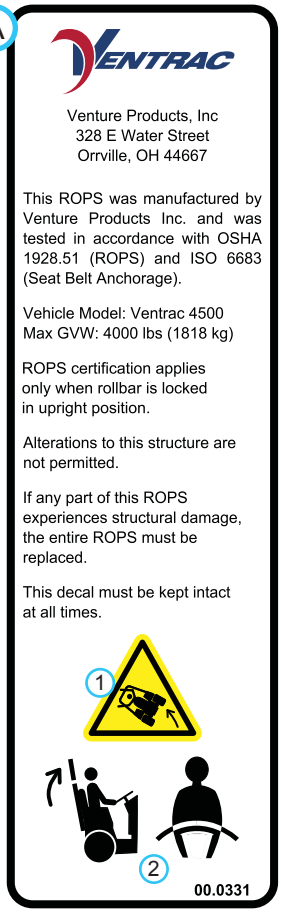
When new components are installed, be sure that current safety decals are affixed to the replacement components.



Vanguard Air Cooled Engine only

Directional/Hazard Light Kit

A


VENTRAC
Venture Products, Inc
328 E Water Street
Orrville, OH 44667
This ROPS was manufactured by Venture Products Inc. and was tested in accordance with OSHA 1928.51 (ROPS) and ISO 6683 (Seat Belt Anchorage).
Vehicle Model: Ventrac 4500
Max GVW: 4000 lbs (1818 kg)
ROPS certification applies only when rollbar is locked in upright position.
Alterations to this structure are not permitted.
If any part of this ROPS experiences structural damage, the entire ROPS must be replaced.
This decal must be kept intact at all times.
1
2
00.0331

1. WARNING: Rollover!
2. Keep the roll bar in the raised and locked position and the seat belt securely fastened during operation.

B

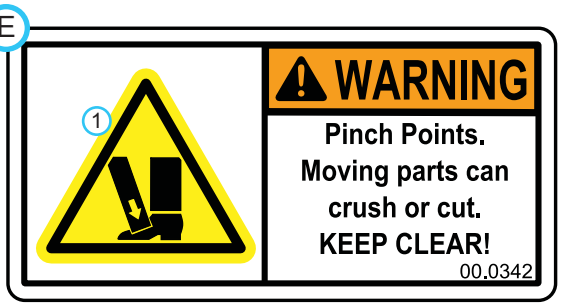
C

1. DANGER: Explosion/Fire Hazard
2. Keep away from fire, sparks, and pilot lights when refueling or storing machine and fuel.
3. Smoking is prohibited.

D

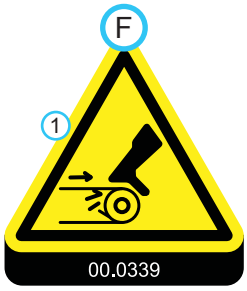
1. WARNING: Read operator's manual
2. Wear personal protective gear, such as safety glasses, closed toe shoes or boots, and ear protection.
3. Do not operate while under the influence of drugs or alcohol.
4. Do not carry passengers. Stop the machine if someone enters the area.
5. WARNING: Keep a safe distance from the edge of drop-offs, ditches, and embankments. The machine could roll over if a wheel drops over the edge or if the edge caves in.
6. WARNING: Read slope operation instructions. Use low range when operating on slopes. Keep the roll bar in the raised and locked position and the seat belt securely fastened.
7. Only lower the roll bar if there is low overhead clearance. DO NOT wear a seat belt when operating with the roll bar in the lowered position. As soon as there is clearance, raise the roll bar to the upright position and lock it in place. ALWAYS wear a seat belt when operating with the roll bar in the raised position.
8. WARNING: Hydraulic fluid is under high pressure and can penetrate skin, causing injury. Keep hands, face, and body away from pinholes or nozzles that eject hydraulic fluid under high pressure.
9. When towing or pushing the power unit, the transaxles must be disengaged by moving the high/low range shift handle to the neutral position.

E



1. Cutting/crushing hazard - Stay away from moving parts.

F

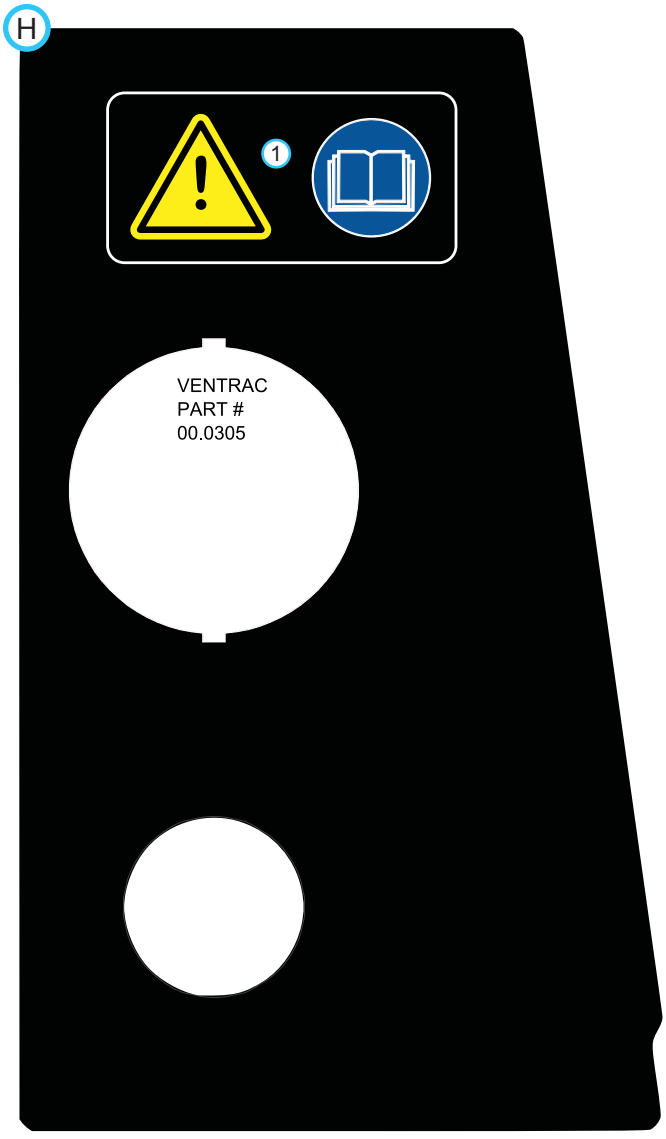


1. Cutting/entanglement hazard - Stay away from moving parts.

G

1. Cutting/dismemberment/entanglement hazard - Stay away from moving parts.

H



1. WARNING: Read operator's manual

J

Operation on slopes increases the possibility for loss-of-control and tip over accidents
Failure to operate responsibly may result in machine damage, personal injury, or death
Use low range when operating on slopes greater than 15°
Never shift between high and low range on a slope
Reduce speed on rough ground or when turning
Tire over-inflation may result in damage to the tractor and/or the operator
Avoid operating in conditions where the outer tire (C) carries full weight
Avoid running wheels into solid objects

Slope Rating - Maximum Angle of Operation

Model	Single Tires	Wheel Extensions	Dual Wheels
	Any Direction	Any Direction	Any Direction
4500	20°	25°	30°
4500Z with Propane	15°	20°	25°

Tire Pressure

Tire Type	Single Wheel (A)	Dual Wheels	
		Inner Tire (B)	Outer Tire (C)
All Terrain	8-16psi (55-110kPa)	8-10psi (55-69kPa)	6-8psi (41-55kPa)
Bar	8-16psi (55-110kPa)	8-10psi (55-69kPa)	6-8psi (41-55kPa)
Turf	15-20psi (103-138kPa)	15-17 psi (103-117kPa)	10-12psi (69-83kPa)

Torque Specifications

Wheel Lug Nut: 55 ft-lbs (75 Nm)	Dual Hub Draw Bolt: 120 ft-lbs (163 Nm)

1. WARNING: 20° maximum rating when equipped with single wheels.
2. WARNING: 25° maximum slope rating when equipped with 3" wheel extensions.
3. WARNING: 30° maximum slope rating when equipped with dual wheels.

K

1. Danger: Battery acid is caustic and can cause chemical burns. Keep bystanders a safe distance from the battery.
2. Explosion hazard - batteries produce flammable and explosive gases.
3. Do not expose batteries to arcs, sparks, or open flames. Do not use smoking materials near batteries.
4. Wear eye protection, such as goggles or a face shield, when checking or servicing batteries.
5. Wear appropriate protective gear, such as rubber gloves and an apron, when checking or servicing batteries.

L

1. Warning: Do not reach over, under, or around guards, covers, or shields. Stay away from moving parts.

M

1. Cutting/crushing hazard - Stay away from moving parts.

Decal	Description	Part Number	Quantity
A	ROPS Certification	00.0331	1
B	Danger, Gasoline Only	00.0332	1
C	Danger, Diesel Only	00.0333	1
D	4500 Safety	00.0336	1
E	Warning, Pinch Point	00.0342	2
F	Moving Parts	00.0339	1
G	Warning, Fan (liquid cooled engines)	00.0341	1
H	Right Dash	00.0305	1
J	Warning, 4500 Slope	00.0347	1
K	Danger, Battery	00.0345	1
L	Warning, Do Not Reach (Vanguard Air Cooled only)	00.0219	1
M	Warning, Pinch Point (directional/hazard light kit)	00.0218	2

General Safety Procedures for Ventrac Power Units, Attachments, & Accessories

Training Required

- The owner of this machine is solely responsible for properly training the operators.
- The owner/operator is solely responsible for the operation of this machine and prevention of accidents or injuries occurring to him/herself, other people, or property.
- Do not allow operation or service by children or untrained personnel. Local regulations may restrict the age of the operator.
- Before operating this machine, read the operator's manual and understand its contents.
- If the operator of the machine cannot understand this manual, then it is the responsibility of this machine's owner to fully explain the material within this manual to the operator.
- Learn and understand the use of all controls.
- Know how to stop the power unit and all attachments quickly in the event of an emergency.

Personal Protective Equipment Requirements

It is the responsibility of the owner to be sure that the operators use the proper personal protective equipment while operating the machine. Required personal protective equipment includes, but is not limited to, the following list.

- Wear a certified ear protection device to prevent loss of hearing.
- Prevent eye injury by wearing safety glasses while operating the machine.
- Closed toe shoes must be worn at all times.
- Long pants must be worn at all times.
- When operating in dusty conditions, it is recommended that a dust mask be worn.

Operation Safety

- Inspect machine before operation. Repair or replace any damaged, worn, or missing parts. Be sure guards and shields are in proper working condition and are secured in place. Make all necessary adjustments before operating machine.
- Some pictures in this manual may show shields or covers opened or removed in order to clearly illustrate any instructions. Under no circumstance should the machine be operated without these devices in place.
- Alterations or modifications to this machine can reduce safety and could cause damage to the machine. Do not alter safety devices or operate with shields or covers removed.
- Before each use, verify that all controls function properly and inspect all safety devices. Do not operate if controls or safety devices are not in proper working condition.
- Check parking brake function before operating. Repair or adjust parking brake if necessary.
- Observe and follow all safety decals.
- All controls are to be operated from the operator's seat only.
- Always wear a seat belt if the machine has a roll cage/bar installed and in the upright position.
- Ensure the attachment or accessory is locked or fastened securely to the power unit before operating.
- Ensure that all bystanders are clear of the power unit and attachment before operating. Stop machine if someone enters your work area.
- Always be alert to what is happening around you, but do not lose focus on the task you are performing. Always look in the direction the machine is moving.
- Look behind and down before backing up to be sure of a clear path.
- If you hit an object, stop and inspect the machine. Make all necessary repairs before operating machine again.
- Stop operation immediately at any sign of equipment failure. An unusual noise can be a warning of equipment failure or a sign that maintenance is required. Make all necessary repairs before operating machine again.

General Safety Procedures for Ventrac Power Units, Attachments, & Accessories

Operation Safety (continued)

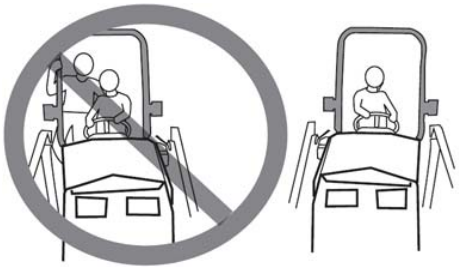
- If equipped with a high/low range feature, never shift between high and low range while on a slope. Always move the machine to level ground and engage the parking brake before shifting range.
- Do not leave machine unattended while it is running.
- Always park the machine on level ground.
- Always shut off engine when connecting attachment drive belt to the power unit.
- Never leave the operator's seat without lowering the attachment to the ground, setting the parking brake, shutting off the engine, and removing the ignition key. Make sure all moving parts have come to a complete stop before dismounting.
- Never leave equipment unattended without lowering the attachment to the ground, setting the parking brake, shutting off the engine, and removing the ignition key.
- Only operate in well-lit conditions.
- Never direct the discharge of any attachment in the direction of people, buildings, animals, vehicles, or other objects of value.
- Never discharge material against a wall or obstruction. Material may ricochet back towards the operator.
- Use extra caution when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
- Do not run the engine in a building without adequate ventilation.
- Do not touch the engine or the muffler while the engine is running or immediately after stopping the engine. These areas may be hot enough to cause a burn.
- Do not change the engine governor settings or over-speed the engine. Operating engine at excessive speed may increase the hazard of personal injury.
- To reduce the hazard of fire, keep the battery compartment, engine, and muffler areas free of grass, leaves, and excessive grease.

Preventing Accidents

- Clear working area of objects that might be hit or thrown from machine.
- Keep people and pets out of mowing area.
- Know the work area well before operation. Do not operate where traction or stability is questionable.
- Reduce speed when you are operating over rough ground.
- Equipment can cause serious injury and/or death when improperly used. Before operating, know and understand the operation and safety of the power unit and the attachment being used.
- Do not operate machine if you are not in good physical and mental health, if you will be distracted by personal devices, or are under the influence of any substance which might impair decision, dexterity, or judgment.
- Children are attracted to machine activity. Be aware of children and do not allow them in the working area. Turn off the machine if a child enters the work area.

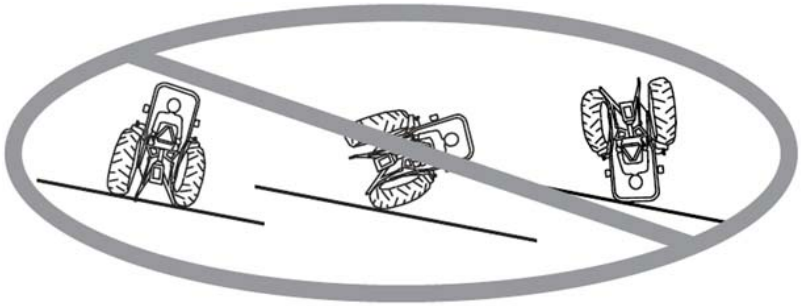
Keep Riders Off

- Only allow the operator on the power unit. Keep riders off.
- Never allow riders on any attachment or accessory.



General Safety Procedures for Ventrac Power Units, Attachments, & Accessories

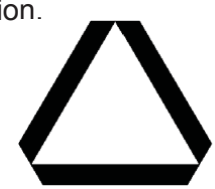
Operating On Slopes



- Slopes can cause loss-of-control and tip-over accidents, which can result in severe injury or death. Be familiar with the emergency parking brake, along with the power unit controls and their functions.
- If power unit is equipped with a fold down roll bar, it must be locked in the upright position when operating on any slope.
- Use low range when operating on slopes greater than 15 degrees.
- Do not stop or start suddenly when operating on slopes.
- Never shift between high and low range while on a slope. Always move the power unit to level ground and place the selector lever in park before shifting range.
- Variables such as wet surface and loose ground will reduce the degree of safety. Do not drive where machine could lose traction or tip over.
- Keep alert for hidden hazards in the terrain.
- Stay away from drop-offs, ditches, and embankments.
- Sharp turns should be avoided when operating on slopes.
- Pulling loads on hills decreases safety. It is the responsibility of the owner/operator to determine loads that can safely be controlled on slopes.
- Transport machine with attachment lowered or close to the ground to improve stability.
- While operating on slopes, drive in an up and down direction when possible. If turning is necessary while driving across slopes, reduce speed and turn slowly in the downhill direction.
- Assure a sufficient supply of fuel for continuous operation. A minimum of one-half tank of fuel is recommended.

Roadway Safety

- Operate with safety lights when operating on or near roadways.
- Obey all state and local laws concerning operation on roadways.
- Slow down and be careful of traffic when operating near or crossing roadways. Stop before crossing roads or sidewalks. Use care when approaching areas or objects that may obscure vision.
- If there is doubt of safety conditions, discontinue machine operation until a time when operation can be performed safely.
- When operating near or on roadways, have a Slow Moving Vehicle Emblem clearly displayed.



Truck Or Trailer Transport

- Use care when loading or unloading machine into a truck or trailer.
- The parking brake is not sufficient to lock the machine during transport. Always secure the power unit and/or attachment to the transporting vehicle.
- Shut off fuel supply to power unit during transport on truck or trailer.
- If equipped, turn the battery disconnect switch to the Off position to shut off electrical power.

General Safety Procedures for Ventrac Power Units, Attachments, & Accessories

Maintenance

- Keep all safety decals legible. Remove all grease dirt, and debris from safety decals and instructional labels.
- If any decals are faded, illegible, or missing, contact your dealer promptly for replacements.
- When new components are installed, be sure that current safety decals are affixed to the replacement components.
- If any component requires replacement, use only original Ventrac replacement parts.
- Always disconnect the negative battery cable from the battery when working with electrical components.
- Keep all bolts, nuts, screws, and other fasteners properly tightened.
- Always lower the attachment to the ground, engage parking brake, shut off engine, and remove the ignition key. Make sure all moving parts have come to a complete stop before cleaning, inspection, adjusting or repairing.
- If the power unit, attachment, or accessory requires repairs or adjustments not instructed in the operator's manual, the power unit, attachment, or accessory must be taken to an authorized Ventrac dealer for service.
- Never perform maintenance on the power unit and/or attachment if someone is sitting in the operator's seat.
- Always use protective glasses when handling the battery.
- Check all fuel lines for tightness and wear on a regular basis. Tighten or repair them as needed.
- To reduce the hazard of fire, keep the battery compartment, engine, and muffler areas free of grass, leaves, and excessive grease.
- Do not touch the engine, the muffler, or other exhaust components while the engine is running or immediately after stopping the engine. These areas may be hot enough to cause a burn.
- Do not change the engine governor settings or over-speed the engine. Operating engine at excessive speed may increase the hazard of personal injury.
- Springs may contain stored energy. Use caution when disengaging or removing springs and/or spring loaded components.
- An obstruction or blockage in a drive system or moving/rotating parts may cause a buildup of stored energy. When the obstruction or blockage is removed, the drive system or moving/rotating parts may move suddenly. Do not attempt to remove an obstruction or blockage with your hands. Keep hands, feet, and clothing away from all power-driven parts.
- Dispose of all fluids in accordance with local laws.

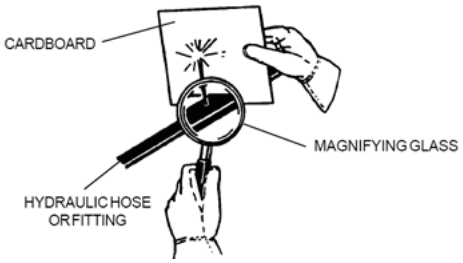
Fuel Safety

- Do not refuel machine while smoking or at a location near flames or sparks.
- Always refuel the machine outdoors.
- Do not store machine or fuel container indoors where fumes or fuel can reach an open flame, spark, or pilot light.
- Only store fuel in an approved container. Keep out of reach of children.
- Never remove fuel cap or add fuel with the engine running. Allow engine to cool before refueling.
- Replace all fuel tank and container caps securely.
- Do not overfill fuel tank.
- If fuel is spilled, do not attempt to start the engine. Move the power unit away from the fuel spill and avoid creating any source of ignition until fuel vapors have dissipated.
- If the fuel tank must be drained, it should be drained outdoors into an approved container.
- Dispose of all fluids in accordance with local laws.
- Check all fuel lines for tightness and wear on a regular basis. Tighten or repair them as needed.
- The fuel system is equipped with a shut-off valve. Shut off the fuel when transporting the machine to and from the job, when parking the machine indoors, or when servicing the fuel system.

General Safety Procedures for Ventrac Power Units, Attachments, & Accessories

Hydraulic Safety

- Make sure all hydraulic connections are tight and all hydraulic hoses and tubes are in good condition. Repair any leaks and replace any damaged or deteriorated hoses or tubes before starting the machine.
- Hydraulic leaks can occur under high pressure. Hydraulic leaks require special care and attention.
- Use a piece of cardboard and a magnifying glass to locate suspected hydraulic leaks.



- Keep body and hands away from pinhole leaks or nozzles that eject high pressure hydraulic fluid. Hydraulic fluid escaping under high pressure can penetrate the skin causing serious injury. If hydraulic fluid is injected into skin, seek immediate medical attention.
- Hydraulic system may contain stored energy. Before performing maintenance or repairs on the hydraulic system, remove attachments, engage parking brake, disengage weight transfer system (if equipped), shut off engine, and remove ignition key. To relieve pressure on the auxiliary hydraulic system, shut off the power unit engine and move the secondary S.D.L.A. lever left and right before disconnecting the auxiliary hydraulic quick couplers.
- Dispose of all fluids in accordance with local laws.

⚠ WARNING

Hydraulic fluid is under high pressure and can penetrate skin, causing injury. Keep hands, face, and body away from pinholes or nozzles that eject hydraulic fluid under high pressure.

KN4500 Safety Procedures

⚠ WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

CALIFORNIA PROPOSITION 65 Diesel Exhaust Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, or other reproductive harm.

CALIFORNIA PROPOSITION 65 Battery Warning

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling!

- Power unit hydraulic system may contain stored energy. Before performing maintenance or repairs on the auxiliary hydraulic circuit, remove attachments, engage the park brake, disengage weight transfer system (if equipped), shut off engine, and remove the ignition key.
- Weight transfer spring may contain stored energy. Always disengage the weight transfer system (if equipped) before performing maintenance or repairs on the weight transfer system, the front hitch, or the lift hydraulics.

Roll Over Protective Structure (ROPS)

⚠ WARNING

Keep the ROPS locked in the upright position and the seat belt securely fastened during operation. Failure to do so could result in serious injury or loss of life.

⚠ WARNING

Alterations or modifications to this machine and/or the ROPS structure can reduce safety and could cause damage to the machine. Do not alter the ROPS. Do not alter any other safety devices.

Your power unit is equipped with a Roll-Over Protective Structure (ROPS). This ROPS was tested in accordance with OSHA 1928.51 (ROPS) and ISO 6683 (Seat Belt Anchorage). This ROPS is certified for use on a Ventrac 4500 with a maximum GVW of 4,000 pounds (1818 Kg).

- ROPS certification applies only when the roll bar is locked in the upright position.
- Alterations to the ROPS structure are not permitted.
- Lower the roll bar only when absolutely necessary and raise the roll bar to the upright position as soon as clearance allows.
- Always wear the seat belt when the roll bar is locked in the upright position.
- Do not wear a seat belt when the roll bar has been lowered to the down position.
- If any part of this ROPS experiences structural damage, the entire ROPS must be replaced.
- Inspect the seat belt for wear or damage before use. Failure to inspect or maintain the seat belt can cause injury or loss of life.

Operator Access System

- The operator access system is on the left side of the power unit. Mount and dismount the 4500 only on the left side of the power unit.

KN4500 Safety Procedures

Propane Safety (if applicable)

DANGER

Propane is flammable and explosive.

Contact with escaping vapors or liquid may cause freezing of tissue or frostbite.

WARNING

Use only commercial liquid propane or HD-5 propane.

Use only liquid withdrawal 33 lb. capacity aluminum propane tanks. Do not use steel or fiberglass tanks.

Notice

Use of propane must be in compliance with any applicable governmental regulations, including National Fire Protection Association (NFPA) Code # 58.

- Check all fittings before use to ensure tight, leak free connections.
- Propane cylinders contain pressurized, flammable liquid and gas. Make sure that anyone who changes or uses the propane cylinders is aware of its dangerous potential.
- Propane cylinders must be used only in compliance with all applicable governmental regulations.
- All persons who operate this machine or services the propane cylinders must be trained in proper procedures and regulations.
- Secure propane cylinders when transporting.
- Always refill propane cylinders outdoors.
- Use commercial propane only.
- Fill propane cylinders at a reputable dealer.
- Do not overfill. Follow approved procedures for filling propane cylinders.
- Do not store either empty or filled propane cylinders in a building or enclosed trailer.
- Turn off the liquid withdrawal valve on the propane cylinder when storing or transporting the power unit.
- Do not expose propane cylinders to fire or heat above 120° F (49° C).
- Do not attempt repairs on a propane cylinder or its components. Contact an authorized LPG dealer or service center.
- If cylinders are dented, gouged, bulging, or corroded, they must be removed from service and replaced.
- When removing a propane cylinder from service, contact an authorized LPG dealer or service center for assistance in proper disposal.
- Propane cylinders must be tested at specific intervals. Contact an authorized LPG dealer or service center for regulations regarding propane cylinder testing.

KN4500 Safety Procedures

Operator Safety Interlock System

The 4500 power unit is equipped with a safety interlock system. This system:

- Prevents the engine from starting unless the parking brake is engaged and SDLA control is in neutral.
- Prevents the PTO from starting if the operator is not in the seat.
- Prevents the power unit from driving if the parking brake is engaged.*
- Shuts off the PTO if the operator leaves the seat^.
- Shuts off the engine (and fuel pump) if the operator leaves the seat without engaging the parking brake.
- Shuts off the engine if the forward / reverse controls (SDLA lever or foot pedal) are moved from neutral while the parking brake is engaged.

*The parking brake must be completely disengaged before moving the SDLA lever forward or backward or the power unit engine will shut off.

^If power unit is equipped with PTO remote kit # 70.4106 and is using an attachment with a remote PTO shut-off switch, the safety interlock system performs additional functions.

Testing the Safety Interlock System

⚠ WARNING

Never operate the power unit if the safety interlock system is malfunctioning. Do not disengage or bypass any switch. Failure to heed warning could result in injury to yourself and others, or damage to property.

⚠ CAUTION

The daily inspection should be performed only when the engine is shut off and all fluids are cold. Lower attachments to the ground, engage the parking brake, and shut off the engine.

Perform the following safety interlock tests daily. Before testing, park the power unit on a level surface, place wheel chocks in front and back of wheels, and place the high/low range shift lever in the neutral position. After testing is complete, place the high/low shift lever in either high or low range, set the parking brake, and remove the wheel chocks.

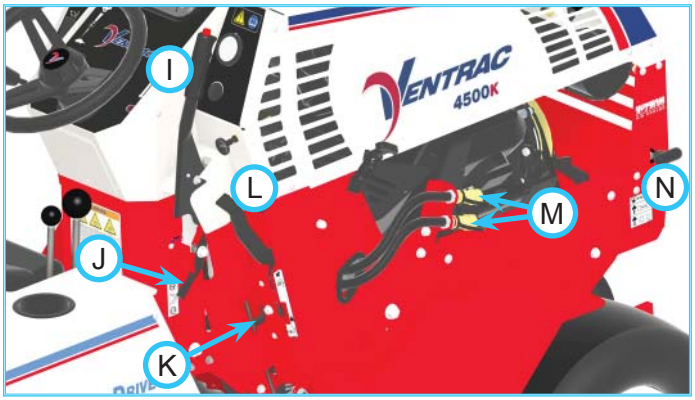
Turn the ignition key to the run position. Tests 1 - 4 test the engine start function, tests 5 - 9 test the engine run function, and tests 10 - 13 test the PTO function.

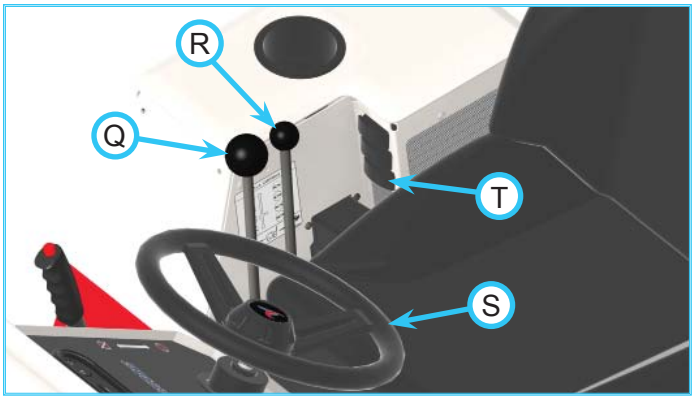
	Test Number	Parking Brake Engaged	Forward/Reverse Control (SDLA) in Neutral	Operator Present in Seat	Engine Starts
Engine Start	1	No	Yes	Yes	No
	2	Yes	No	Yes	No
	3	Yes	Yes	No	Yes
	4	Yes	Yes	Yes	Yes
Engine Run	**Test Number**	**Parking Brake Engaged**	**Forward/Reverse Control (SDLA) in Neutral**	**Operator Present in Seat**	**Engine Runs**
	5	Yes	Yes	Yes	Yes
	6	Yes	Yes	No	Yes
	7	Yes	No	No	No
	8	Yes	No	Yes	No
	9	No	Yes	No	No
PTO	**Test Number**	**PTO Switch**		**Operator Present in Seat**	**PTO Clutch**
	10	Off		Yes	Off
	11	Pull to 'On' Position		No	No
	12	Pull to 'On' Position		Yes	Yes
	13	On		Raise Operator Body Weight from Seat	PTO Disengages (1/2 second delay)

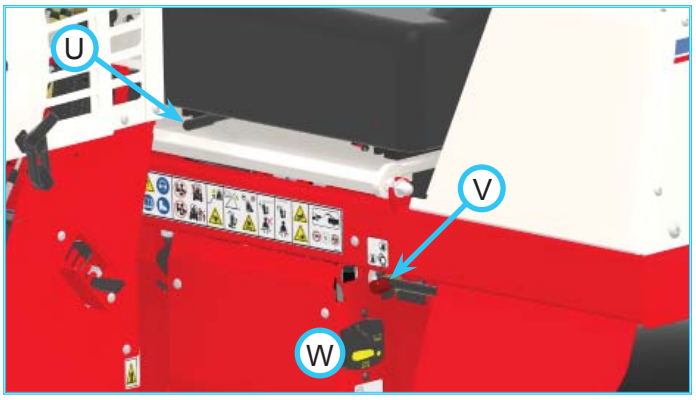
If the power unit fails any one of the safety interlock tests, refer to the troubleshooting section for using the TCM (tractor control module) to diagnose electrical problems.

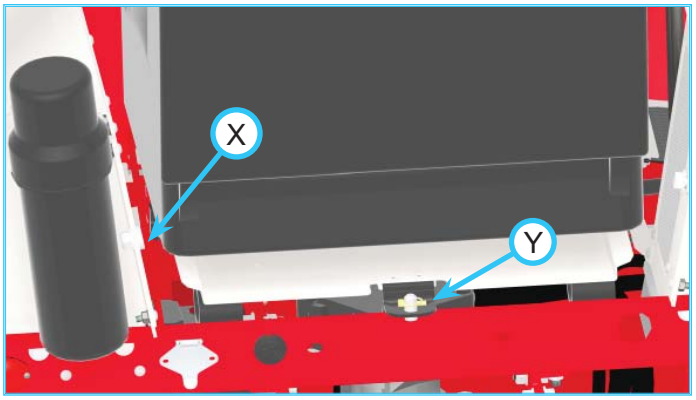
Standard Operational Control Locations

Use the following images to help identify the locations of operational controls. The letter next to each control can be referenced to the list that follows these images.





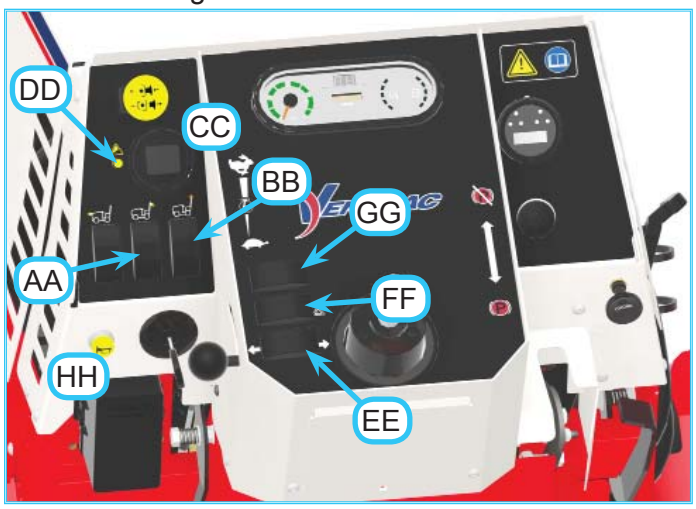


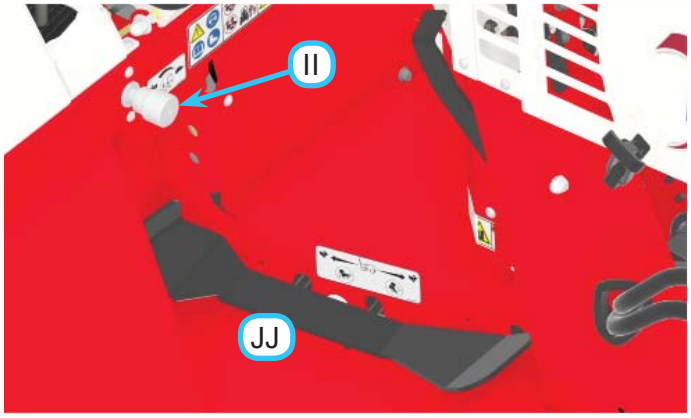


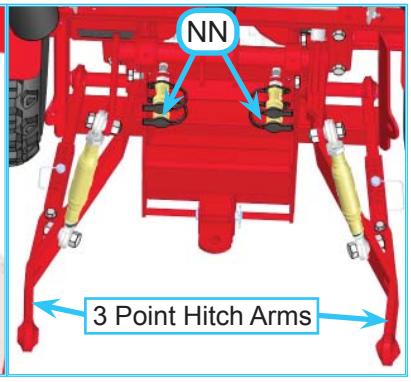
A. Information Cluster Gauge
B. Warning Cluster Gauge
C. Warning Alarm (Continuous)
D. Ignition Switch
E. Throttle Lever
F. Headlight Switch
G. PTO Switch
H. Choke Handle (if equipped)
I. Parking Brake
J. Neutral Assist Lever
K. Front Hitch Lever Lock
L. Front Hitch Latch Lever
M. Auxiliary Hydraulic Quick Couplers
N. PTO Belt Tensioner Rod
O. High/Low Shift Lever
P. Weight Transfer Select Lever (if equipped)
Q. Primary SDLA Control Lever
R. Secondary SDLA Control Lever
S. Steering Wheel
T. Hydraulic Cooler Fan Switch
U. Seat Slide Lever
V. Fuel Shut-off Valve
W. Circuit Breaker & Battery Disconnect
X. Seat Prop Plate
Y. Seat Latch Strap

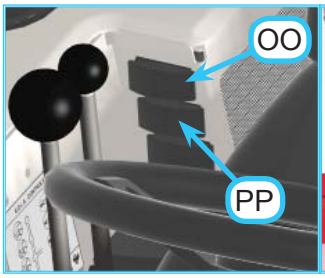
Optional Operational Control Locations

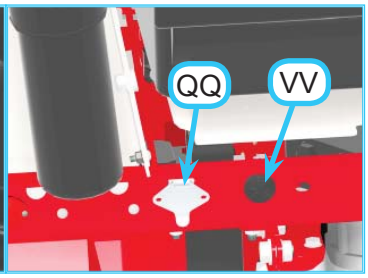
Use the following images to help identify the locations of operational controls for optional kits. The letter next to each control can be referenced to the list that follows these images.

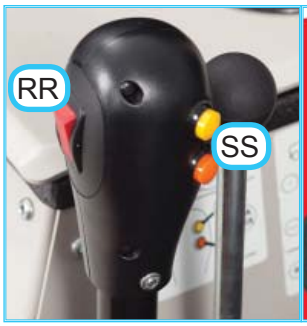


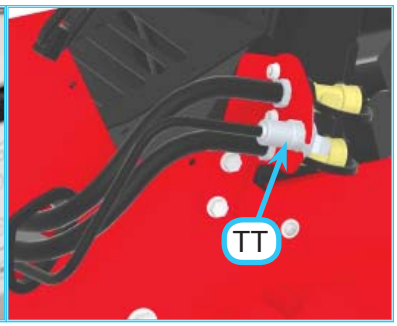












AA. Work Light Switch
BB. Strobe Light Switch
CC. Slope Indicator Gauge
DD. Slope Warning Light
EE. Directional Signal Switch
FF. Hazard Flasher Switch
GG. Gas/Propane Selector Switch (4500Z only)
HH. Horn Switch
II. Front Hitch Valve
JJ. Foot Pedal
KK. 3 Point Hitch Control Handle
LL. Left Rear Auxiliary Hydraulics Handle
MM. Right Rear Auxiliary Hydraulics Handle
NN. Rear Auxiliary Hydraulic Quick Couplers
OO. Rear 12V Switch (On/Off)
PP. Rear 12V Switch (Momentary On/Off/On)
QQ. Rear 12V 4-Pin Socket
RR. Front 12V Switch (On/Off)
SS. Front 12V Switch (Momentary On/Off/On)
TT. Front 12V 4-Pin Socket
UU. Electric PTO Remote Socket
VV. Back Up Alarm

Information Cluster Gauge (A)

1. Tachometer
2. Speedometer
3. Hour Meter
4. Water Temperature Gauge
5. Fuel Gauge
6. Glow Plug Indicator Light

The information cluster gauge contains a tachometer, speedometer, hour meter, water temperature gauge (liquid cooled engines only), fuel gauge, and glow plug indicator light (diesel engine only).

The **tachometer** displays the engine speed in RPM.

The **speedometer** displays the speed of the power unit. The speedometer can be set to display either miles per hour (mph) or kilometers per hour (kph).

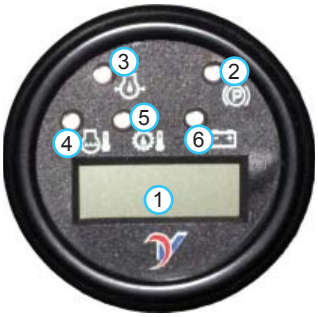
The **hour meter** records the accumulated time the ignition key has been switched to the on position.

The **water temperature gauge** displays the temperature of the engine cooling system (liquid cooled engines only).

The **fuel gauge** displays the level of fuel in the tank.

The **glow plug indicator light** indicates activation of the glow plugs for preheating the engine (diesel engine only). The glow plugs activate when the key is turned to the on position. When the glow plug light turns off, the engine is ready to start.

Warning Cluster Gauge (B)



1. Volt Meter
2. Park Brake Indicator Light
3. Low Engine Oil Pressure Warning Light
4. High Water Temperature Warning Light
5. High Hydraulic Fluid Temperature Warning Light
6. Low Voltage Warning Light

The warning cluster gauge contains a volt meter, a park brake indicator light, low engine oil pressure warning light, high water temperature warning light, high hydraulic fluid temperature warning light, and low voltage warning light.

The **volt meter** displays the voltage level of the charging system.

The **park brake indicator light** activates when the park brake is set.

The **low engine oil pressure warning light** activates when the engine oil pressure is below safe levels. The light comes on when the ignition key is switched to the on position and stays illuminated until the engine is started and safe oil pressure develops. If this light comes on during operation, immediately shut off the engine. Do not restart the engine until the problem has been located and corrected.

The **water high temperature warning light** activates when the temperature of the engine cooling systems reaches unsafe levels. If this light comes on during operation, park the power unit, shut off the engine, and allow the engine to cool. Check the radiator screen and engine compartment and clean, if necessary. If the engine continually overheats, refer to the troubleshooting section for possible problems.

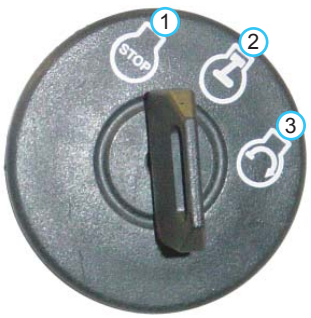
The **hydraulic fluid high temperature warning light** activates when the hydraulic fluid reaches unsafe levels. If this light comes on during operation, park the power unit and move the throttle lever to the idle position. Check the hydraulic cooling fan to ensure it is operating properly and refer to the troubleshooting section for possible problems.

The **low voltage warning light** activates when the voltage drops to unacceptable levels. If this light comes on, shut off any unnecessary lights and accessories to reduce current draw. If voltage continues to drop, park the power unit, shut off the engine, and turn the ignition key to the off position. Refer to the troubleshooting section for possible problems.

Warning Alarm (C)

The warning alarm works with the warning cluster gauge to alert the operator to problems. The warning alarm sounds a continuous signal whenever a warning is displayed on the warning cluster gauge. If the warning alarm sounds, immediately check the warning cluster gauge to determine the cause of the warning and then take appropriate action.

Ignition Switch (D)



1. Off or Stop Position - all 12 volt power going through the key switch is off.
2. On or Run Position - engine run position, 12 volt power is sent to accessories.
3. Start Position - when the key is turned to the start position, the starter will engage.

Throttle Lever (E)

1. Fast
2. Slow

Moving the throttle lever forward toward the fast position increases the engine Revolutions Per Minute (RPM). Moving the throttle lever backward toward the slow position decreases the engine RPM.

Headlight Switch (F)

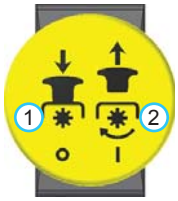
1. On
2. Off

Depressing the top (1) of the headlight switch turns on the headlights and taillights. Depressing the bottom (2) of the switch turns the lights off.

Power Take Off (PTO) Switch (G)

Pulling up on the PTO switch engages the electric clutch to provide power to the front attachment.

Pushing down on the PTO switch disengages the electric clutch and applies the clutch brake to stop the attachment. NOTE: the PTO will turn off automatically if the operator leaves the seat. The PTO can be restarted by turning the PTO switch off and then on again.



1. PTO Off
2. PTO On

Choke Handle (H)

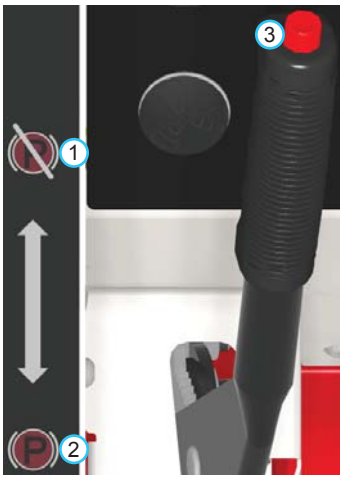
Pull the choke handle out to aid in starting a cold engine. Push the choke handle in for operation. NOTE: a choke control is not used on power units with diesel or fuel injected engines.

Parking Brake (I)

When parking the power unit, always engage the parking brake to prevent accidental movement of the machine.

To engage the parking brake, pull the brake handle back toward the operator.

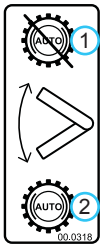
To disengage the parking brake, pull back slightly on the brake handle to relieve pressure, push down the release button (3) on the top of the handle, and push the handle forward. If the parking brake is set, any attempt to move the power unit will shut off the engine. If the operator leaves the seat without first setting the parking brake, the engine will shut off.



1. Parking Brake Disengaged
2. Parking Brake Engaged (Set)
3. Parking Brake Release Button

Neutral Assist Lever (J)

1. Neutral Assist Off
2. Neutral Assist On



Placing the neutral assist lever in the on position (2) engages the neutral assist spring to help return the SDLA control levers to the neutral position. This makes the neutral position easy to select and maintain. The neutral assist on position is recommended when learning the operation of the power unit, loading or unloading, attaching and removing attachments, and whenever the operator is unsure of the power unit's response to the task being performed.

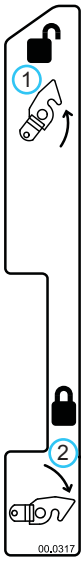
Placing the neutral assist lever in the off position (1) disengages the neutral assist spring. This position is designed for experienced operators when using the power unit in open areas where travel speed and direction are relatively constant and control is easily maintained. The neutral assist off position reduces operator arm fatigue when using the power unit for prolonged periods of time.

⚠ CAUTION

Stopping the power unit with the neutral assist lever in the off position requires the operator to manually return the SDLA control lever or foot pedal to the neutral position.

Front Hitch Lever Lock (K)

The front hitch lever lock prevents the accidental release of the front hitch latch lever. To release the front hitch latch lever, lift the tab on the front hitch lever lock and then move the front hitch latch lever to the unlock position.



Front Hitch Latch Lever (L)

1. Unlocked
2. Locked

The front hitch latch lever locks or unlocks the hitch latch.

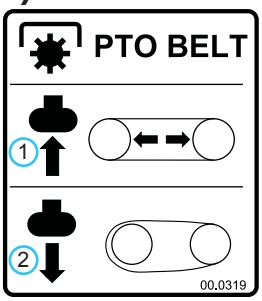
Raise the front hitch latch lever to unlock the hitch latch when attaching or detaching Ventrac attachments.

Lower the front hitch latch lever to lock the hitch latch over the hitch arm pins on Ventrac attachments. Ensure the lever is secured in the frame notch and the front hitch lever lock is in place.

Auxiliary Hydraulic Quick Couplers (M)

The two couplers are a part of the auxiliary hydraulic circuit and are used with an attachment which requires hydraulics (e.g. to angle a dozer blade or rotate the discharge on the snow blower).

PTO Belt Tensioner Rod (N)



1. Belt Tension Engaged
2. Belt Tension Released

The PTO belt tensioner rod applies or releases belt tension to the attachment drive belt.

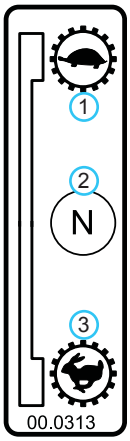
After placing the attachment drive belt onto the PTO drive pulley, pushing the PTO belt tensioner rod in (1) until it locks applies tension to the attachment drive belt.

Pulling the the PTO belt tensioner rod out (2) releases the belt tension, allowing the operator to remove or install the attachment drive belt.

High/Low Shift Lever (O)

⚠ CAUTION

Never shift while under load, while moving, or while on a slope. Always ensure the shift lever is secured in the lock position at the end of each shift stroke.



1. Low Range
2. Neutral
3. High Range

The high/low range shift lever shifts both the front and rear transaxles simultaneously.

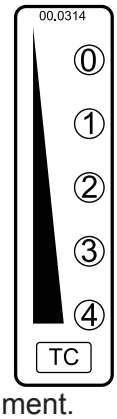
With the power unit parked on level ground, push the shift lever forward to select low range (1).

Move the shift lever to middle of the shift stroke to place the transaxle gears in neutral (2).

Pull the shift lever back toward the operator to select high range (3).

Ensure the shift lever is secured in the lock position at the end of each shift stroke.

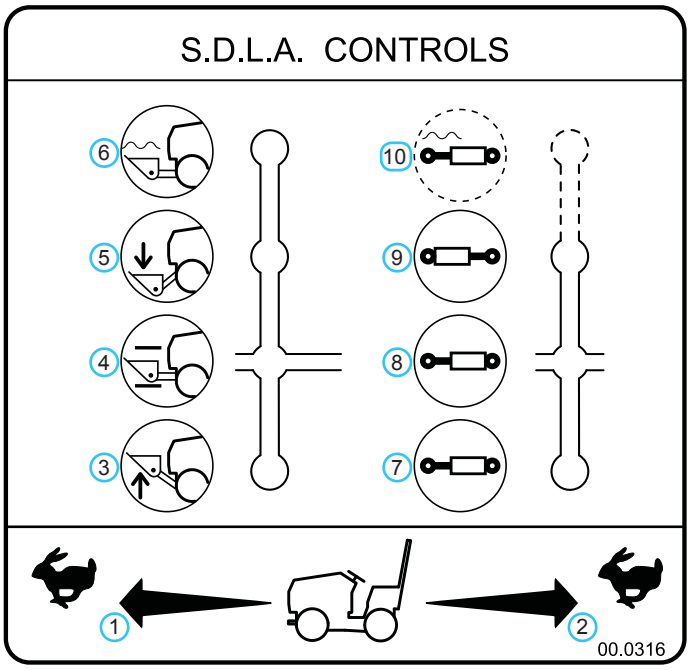
Weight Transfer Traction Control Select Lever (P)



The weight transfer system transfers weight from the attachment to the front wheels of the power unit. Transferring weight from the attachment to the power unit increases the traction control, improves hillside maneuverability, aids in lifting the attachment, reduces steering effort, and lessens the attachment resistance when in contact with the ground.

The operator can select different transfer rates by selecting one of the five positions from no weight transfer (0) to maximum weight transfer (4). Set the weight transfer to 0 when attaching or detaching any attachment.

SDLA Control Lever (Q & R)



1. Forward Direction
2. Reverse Direction
3. Lift
4. Hold
5. Lower
6. Float
7. Direction #1
8. Hold
9. Direction #2
10. Float (if equipped)

The SDLA (Speed, Direction, Lift, and Auxiliary) is the primary control for the power unit and consists of two levers. The primary SDLA control lever (Q) controls the speed, direction of travel, and lift of the hitch arms. The secondary SDLA control lever (R) controls the auxiliary hydraulic circuit.

S - Speed: the amount of forward or backward movement of the primary SDLA lever controls the ground speed of the power unit.

D - Direction: the forward or backward movement of the primary SDLA lever controls the direction of the power unit.

L - Lift: the lift function of the primary SDLA lever has four positions: Up, Hold, Down, and Float Lock. “Hold” is the default position; this holds the lift arms from moving up or down. Pulling the lever to the left raises the hitch arms. Pushing the lever to the right lowers the hitch arms. Float position is attained by pushing the lever to the right until the float detent locks the lever in place.

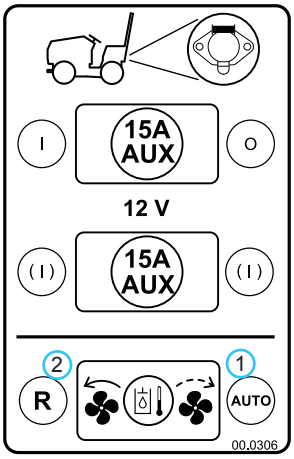
A - Auxiliary: the left or right movement of the secondary SDLA lever controls the functions of attachments that require the auxiliary hydraulic circuit. An optional float kit (part # 23.0111-7) is available for the auxiliary circuit.

Steering Wheel (S)

Turn the steering wheel to the left (counterclockwise) to turn the power unit to the left. Turn the wheel to the right (clockwise) to turn the power unit to the right.

Hydraulic Cooler Fan Switch (T)

The hydraulic oil cooler fan switch is normally set to the automatic thermostatically controlled position (1). This allows the thermostat to turn on the cooling fan when the hydraulic fluid reaches the set temperature. The fan pulls air through the right fender next to the operator, through the oil cooler, and discharges the air out the back of the power unit.



1. Normal (auto) Operation
2. Reverse Operation

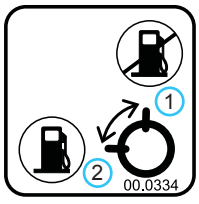
The switch can be set to the reverse position (2) to pull air from the back of the power unit, through the oil cooler, and discharge the warm air next to the operator. This feature can be used to help provide warmth for the operator during cold weather.

Seat Slide Lever (U)

Move the seat slide lever to the left to release the seat lock. Move the seat forward or backward to the desired position and release the seat slide lever to lock the seat in place.

Fuel Shut-off Valve (V)

The fuel shut-off valve controls the flow of fuel to the power unit engine. Turning the valve to position 2 will allow fuel to flow to the engine.

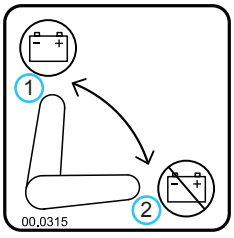


1. Fuel Off
2. Fuel On

Turning the valve to position 1 shuts off the fuel flow to prevent fuel leakage when changing fuel filters or servicing the fuel system. Turn off the fuel shut-off valve when transporting the power unit on a truck or trailer and when parking the power unit indoors.

Circuit Breaker & Battery Disconnect (W)

The circuit breaker/battery disconnect switch controls power to the entire electrical system. Turning the switch to position 2 disables the electrical system, allowing electrical components to be serviced.



1. Electrical Power On
2. Electrical Power Off

Seat Prop Plate (X)

The seat prop plate secures the seat in the flipped forward position while service is performed under the seat.

To secure, tilt the seat forward, lift up the seat prop, and insert the end into the wide portion of the seat plate slot. Ensure the seat prop plate snaps into the narrow portion of the slot to prevent accidental release.

To release, move the seat prop plate over into the wide portion of the seat slot and tilt the seat forward. Lower the seat prop plate back into the seat box and lower the seat back down to the operating position.

Seat Latch Strap (Y)

The seat latch strap secures the seat during transport of the power unit.

To secure the seat, place the tab on the end of the seat latch strap over the seat latch pin. Install the linch pin through the hole in seat latch pin to secure.

To release the seat so that it can be tilted forward for service, remove the linch pin and lift the tab on the seat latch strap off the seat latch pin.

Work Light Switch (AA)

1. On
2. Off

Depressing the top (1) of the work light switch turns on the work lights. Depressing the bottom (2) of the switch turns the work lights off.

Strobe Light Switch (BB)

1. On
2. Off

Depressing the top (1) of the strobe light switch turns on the strobe light. Depressing the bottom (2) of the switch turns the strobe light off.

Slope Indicator Gauge (CC)

The digital slope indicator gauge works with a bidirectional slope meter to display the angle of a slope in degrees. NOTE: sudden changes in speed or direction may affect the slope value displayed.

Slope Warning Light (DD)

The slope warning light works with the slope indicator system to provide a visual warning when the slope value exceeds 20 degrees.

Directional Signal Switch (EE)

1. Left Turn Signal
2. Right Turn Signal

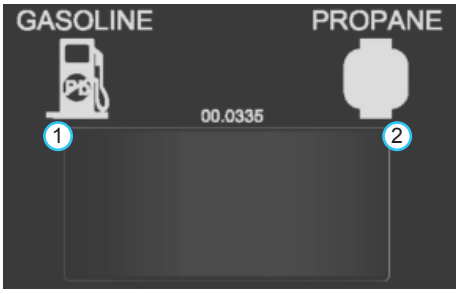
Pressing the left portion of the directional signal switch turns on the left turn signal. Pressing the right portion of the directional signal switch turns on the right turn signal. Return the switch to the middle position to turn off the signals. The left and right turn signals will override the hazard flashers.

Hazard Flasher Switch (FF)

1. Hazard Flasher On
2. Hazard Flasher Off

Depressing the right portion of the hazard flasher switch flashes both directional turn signal lights. Depressing the left portion of the switch turns the hazard flasher lights off. Use of the directional turn signals will override the hazard flashers until the turn signals are turned off.

Gas/Propane Selector Switch (GG)



1. Unleaded Gasoline
2. Liquid Propane

The gas/propane selector switch is used to select either gasoline or propane fuel. Depress the left portion of the switch to select gasoline. Depress the right portion of the switch to select propane.

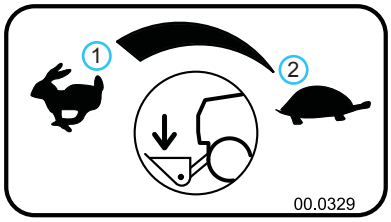
Horn Switch (HH)

Press the horn switch to sound the signal horn. The horn will sound until the horn switch is released.

1. Horn Signal

Front Hitch Valve (II)

The front hitch valve is used to control the lowering of the front hitch.



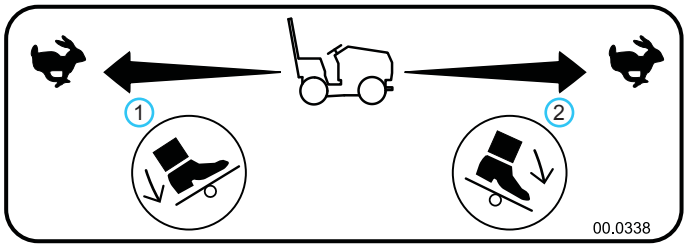
1. Fast
2. Slow/Locked

Turning the knob on the front hitch valve counterclockwise increases the speed at which the front hitch and attachment can be lowered.

Turning the knob clockwise decreases the speed at which the front hitch and attachment can be lowered.

The front hitch and attachment can be locked in any position so that it will not lower, by turning the front hitch valve knob clockwise until it is completely closed. When operating 3-point hitch implements, it may be helpful to lock the front hitch and attachment in a raised position, to prevent accidental lowering of the front attachment.

Foot Pedal (JJ)



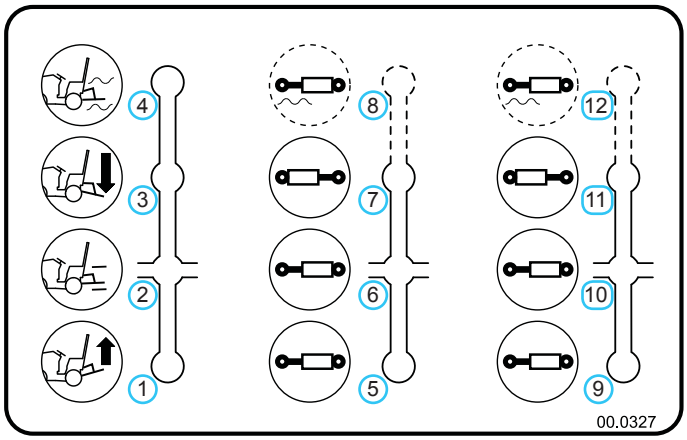
1. Reverse Direction
2. Forward Direction

The foot pedal works in conjunction with the SDLA control lever and can be used to control the speed and direction of the power unit when the operator's hand is removed from the SDLA lever.

Press down on the front portion of the foot pedal to move the power unit in the forward direction. Press down on the rear portion of the foot pedal to move the power unit in the reverse direction. Changing the amount the foot pedal is depressed will immediately change the ground speed of the power unit.

To slow or stop (brake) the power unit, press down on the opposite portion of the foot pedal (i.e. if you are traveling forward, press down on the rear portion of the foot pedal).

3 Point Hitch & Rear Auxiliary Control Handles (KK, LL, & MM)



1. 3 Point Hitch Lift
2. 3 Point Hitch Hold
3. 3 Point Hitch Lower
4. 3 Point Hitch Float
5. Left Auxiliary Hyd. Couplers Direction #1
6. Left Auxiliary Hyd. Couplers Hold
7. Left Auxiliary Hyd. Couplers Direction #2
8. Left Auxiliary Hyd. Couplers Float (if equipped)
9. Right Auxiliary Hyd. Couplers Direction #1
10. Right Auxiliary Hyd. Couplers Hold
11. Right Auxiliary Hyd. Couplers Direction #2
12. Right Auxiliary Hyd. Couplers Float (if equipped)

The left control handle (KK) controls the position of the 3 point hitch arms. Pulling up on the handle raises the 3 point hitch arms. Pushing down on the handle lowers the 3 point hitch arms. Float position is attained by pushing the handle down until the float detent locks the handle in place.

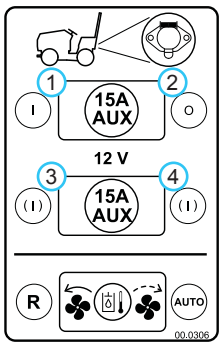
The middle control handle (LL) controls the left rear set of hydraulic quick couplers. Pull the handle up to activate the attachment hydraulic cylinder in direction #1. Push the handle down to activate the attachment hydraulic cylinder in direction #2.

The right control handle (MM) controls the right rear set of hydraulic quick couplers. Pull the handle up to activate the attachment hydraulic cylinder in direction #1. Push the handle down to activate the attachment hydraulic cylinder in direction #2.

Rear Auxiliary Quick Couplers (NN)

The rear auxiliary hydraulic quick couplers are used to control auxiliary functions of attachments that are being used with the 3 point hitch. The 3 point hitch includes 2 sets of hydraulic quick couplers.

12 Volt Rear Switches & 4-Pin Socket (OO, PP, & QQ)



1. On
2. Off
3. Momentary On
4. Momentary On

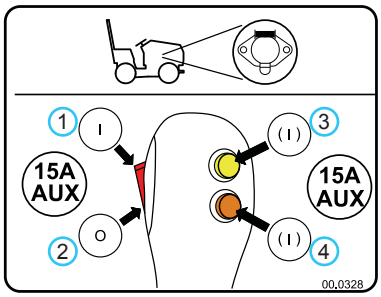
The rear 4-pin socket provides electrical power to rear mounted attachments that are equipped with electrical controls. (e.g. ES220 Spreader)

The switches turn off and on the electrical power to the rear 4-pin socket.

Depressing the right portion (1) of the on/off switch turns on electrical power to the 4-pin socket. Depressing the left portion (2) of the switch turns off electrical power.

Depressing the right (3) or left (4) portion of the mo/off/mo switch turns on electrical power to the 4-pin socket. Releasing the switch turns off electrical power.

12 Volt Front Switches & 4-Pin Socket (RR, SS, & TT)



1. On
2. Off
3. Momentary On
4. Momentary On

The front 4-pin socket provides electrical power to attachments that are equipped with electrical controls. (e.g. broom rotation actuator, snow blower discharge chute angle)

The switches turn off and on the electrical power to the front 4-pin socket.

Depressing the top portion (1) of the on/off switch turns on electrical power to the 4-pin socket. Depressing the bottom portion (2) of the switch turns off electrical power.

Depressing either the top (3) or bottom (4) momentary on switch turns on electrical power to the 4-pin socket. Releasing the switch turns off electrical power.

Electric PTO Remote Socket (UU)

The electric PTO remote socket is used with attachments equipped with a remote PTO switch (e.g. HG150 generator), allowing the operator to shut off the power unit PTO from the attachment.

Back Up Alarm (VV)

The back up alarm emits an intermittent signal when the power unit is operated in reverse to alert nearby persons that the power unit is backing up.

Daily Inspection

⚠ WARNING

Always set the parking brake, shut off power unit engine, remove the ignition key, and ensure all moving parts have come to a complete stop before inspecting components, or attempting any repair or adjustment.

1. Park the power unit on a level surface, with the engine shut off and all fluids cold.
2. Perform a visual inspection of the power unit. Look for loose or missing hardware, damaged components, or signs of wear.
3. Inspect the ROPS structure and seat belt for damage or signs of wear.
4. Inspect the battery, electrical connections, and lights.
5. Ensure parking brake tension is properly adjusted.
6. Inspect hydraulic hoses, hydraulic fittings, and fuel lines to ensure tight, leak free connections.
7. Inspect belts for damage or excessive wear. Service as required.
8. Check the power unit's engine oil level, hydraulic oil level, coolant level (if equipped), and fuel level. Add fluid or service as required.
9. Ensure the radiator screen (if equipped), air cleaner, and engine compartment are clean.
10. Check tires for proper inflation.
11. Test the operator safety interlock system.

Starting The Engine

⚠ CAUTION

Do not use ether or starting fluids. Use of starting fluids in the air intake system may be potentially explosive or cause a runaway engine condition. Use of starting fluids could result in engine damage and/or personal injury.

⚠ CAUTION

Allow time for hydraulic oil to circulate before operating the power unit. Severe damage could result to the hydraulic system if adequate warm up isn't allowed. Warm up time is increased in colder weather.

The 4500 is equipped with an interlock system for operator safety. The safety interlock system requires the parking brake to be engaged and the SDLA lever to be in the neutral position.

1. Turn the fuel shut-off valve to the On position.
2. Turn the battery disconnect switch to the On position.

Follow the listed procedure for your engine to start the power unit engine.

4500K Vanguard Gas

1. Pull out the choke handle to the choke or start position. Choke may not be required when the engine is at operating temperature.
2. Move the throttle lever to the fast position.

⚠ CAUTION

Do not run the electric starter continuously for more than 5 seconds. If the engine does not start right away, wait 1 minute and try again.

3. Turn the ignition key to the start position and hold to engage the starter. Release the key when the engine starts. NOTE: if engine fails to start, refer to the troubleshooting section.
4. As the engine warms up, gradually push the choke handle in to the run position. Wait until the engine runs smoothly before each adjustment.
5. The engine and hydraulic oil must be warmed to operating temperature before operations. Allow the unit to run at approximately 1800 rpm until the hydraulic filter is warm to touch. The hydraulic filter is located below the front fuse panel to the left of the dash.

4500P Kawasaki Gas

1. Move the throttle lever to the half throttle position. (Engine is fuel injected; there is no choke.)

⚠ CAUTION

Do not run the electric starter continuously for more than 5 seconds. If the engine does not start right away, wait 15 seconds and try again.

2. Turn the ignition key to the start position and hold to engage the starter. Release the key when the engine starts. NOTE: if engine fails to start, refer to the troubleshooting section.
3. The engine and hydraulic oil must be warmed to operating temperature before operations. Allow the unit to run at approximately 1800 rpm until the hydraulic filter is warm to touch. The hydraulic filter is located below the front fuse panel to the left of the dash.

4500Z Kubota Gasoline Or Propane Gasoline Use

1. Place the gas/propane selector switch in the gasoline position.
2. Pull out the choke handle to the choke or start position. Choke may not be required when the engine is at operating temperature.
3. Move the throttle lever to the slow idle position.

⚠ CAUTION

Do not run the electric starter continuously for more than 10 seconds. If the engine does not start right away, wait 30 seconds and try again.

4. Turn the ignition key to the start position and hold to engage the starter. Release the key when the engine starts. NOTE: if engine fails to start, refer to the troubleshooting section.
5. As the engine warms up, gradually push the choke handle in to the run position. Wait until the engine runs smoothly before each adjustment.
6. The engine and hydraulic oil must be warmed to operating temperature before operations. Allow the unit to run at approximately 1800 rpm until the hydraulic filter is warm to touch. The hydraulic filter is located below the front fuse panel to the left of the dash.

Propane Use

⚠ Attention

If the temperature is 20° F (-6° C) or below, start the power unit on gasoline and allow to warm up for 2 minutes, then switch to LPG. Warm engines can be started on LPG.

1. Ensure the LPG hose is properly connected to the liquid withdrawal valve of the LPG tank.
2. Turn the liquid withdrawal valve to the on position.
3. Place the gas/propane selector switch in the propane position.
4. Move the throttle lever to the slow idle position.

⚠ CAUTION

DO NOT move the choke handle when starting the engine using LPG fuel. Moving the choke handle from the run position could cause the LPG vaporizer to break down.

⚠ CAUTION

Do not run the electric starter continuously for more than 10 seconds. If the engine does not start right away, wait 30 seconds and try again.

5. Turn the ignition key to the start position and hold to engage the starter. Release the key when the engine starts. NOTE: if engine fails to start, refer to the troubleshooting section.
6. The engine and hydraulic oil must be warmed to operating temperature before operations. Allow the unit to run at approximately 1800 rpm until the hydraulic filter is warm to touch. The hydraulic filter is located below the front fuse panel to the left of the dash.

Switching Between Gasoline And Propane 4500Z

To convert the fuel being used (gasoline ↔ propane) while the engine is running, the engine must be at full throttle and under no load. If you convert the fuel with the engine at low speed, the engine will shut off.

1. Ensure the fuel shut-off valve is turned to the on position if converting to gasoline, or the liquid withdrawal valve is on if converting to propane.
2. Move the throttle lever to the fast position.
3. Switch the gas/propane selector switch to the desired fuel.

4500Y Kubota Diesel

1. Move the throttle lever to just past the half throttle position.
2. Turn the ignition key to the run position to activate the glow plugs for preheating the combustion chamber. When the glow plug indicator light turns off, the engine is ready to start. If the engine is at operating temperature, the engine does not need to be preheated. If the ambient temperature is below 23° F (-5° C), the preheating cycle may need to be repeated prior to starting.

⚠ CAUTION

Do not run the electric starter continuously for more than 10 seconds. If the engine does not start right away, wait 30 seconds and try again.

3. Turn the ignition key to the start position and hold to engage the starter. Release the key when the engine starts. NOTE: if engine fails to start, refer to the troubleshooting section.
4. The engine and hydraulic oil must be warmed to

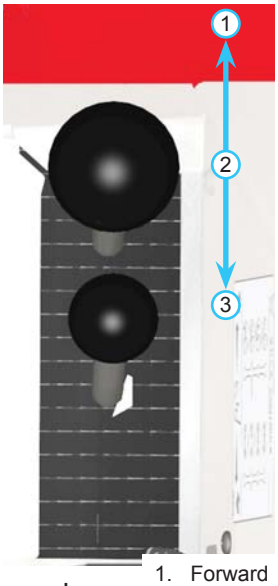
operating temperature before operations. Allow the unit to run at approximately 1800 rpm until the hydraulic filter is warm to touch. The hydraulic filter is located below the front fuse panel to the left of the dash.

Forward And Reverse

Set the neutral assist lever to the desired position. Verify that the intended path is safe and free from obstacles. When safe to move, begin by disengaging the parking brake.

⚠ WARNING

Never remove your right hand from the SDLA control lever unless you are using an optional foot pedal to control speed and direction. All direction, speed, and braking are controlled by the SDLA lever or the foot pedal. Depending on the terrain or rate of speed, more force may be required to maintain speed, change direction, or brake. Your hand or foot must always be ready to brake or stop the power unit.



1. Forward
2. Neutral
3. Reverse

Power unit movement is controlled by moving the SDLA control lever in the desired direction of travel. Push the SDLA control lever forward to move power unit in the forward direction. Pull the SDLA control lever backward to make the power unit move in the reverse direction. Changing the amount the SDLA control lever is moved instantly changes the ground speed of the power unit. Moving it one half of the stroke will result in approximately one half of the maximum ground speed. Moving it to the end of the stroke will result in maximum ground speed.

If the power unit is equipped with an optional foot pedal, the foot pedal can be used to control speed and direction instead of the SDLA control lever.

The SDLA control should be used for precision control in tight spaces or when connecting an attachment. The foot pedal is better suited to controlling speed and direction in open areas.

Stopping The Power Unit

To slow or stop the power unit, move the SDLA control lever in the opposite direction that you are traveling. Return the SDLA control lever to the neutral position to make a complete stop.

If the power unit is equipped with an optional foot pedal, the foot pedal can be used to control speed and direction instead of the SDLA control lever.

If in the case of an emergency, the power unit cannot be stopped with the SDLA control lever, pull back the parking brake lever to engage the parking brake.

⚠ CAUTION

If the parking brake is engaged while the power unit is moving, the engine will shut off and the power unit will come to an abrupt stop.

Shutting Off The Engine

1. Park the power unit on a level surface and set the parking brake.
2. Move the throttle lever to the slow idle position.
3. Allow the engine to idle for 3-5 minutes.
4. **4500K Vanguard only**: move the throttle lever to the fast position.
5. Turn the ignition key to the off position and remove the key from the ignition switch.
6. When parking the power unit at the end of the day, turn the battery disconnect switch and the fuel shut-off valve to the Off positions.

Attaching

1. Drive the power unit slowly forward into the hitch arms of the attachment. Align the lift arms of the power unit with the attachment hitch arms by raising or lowering the front hitch and complete the engagement.
2. Once completely engaged, move the front hitch latch lever to the locked position.
3. Engage the parking brake and shut off the engine.
4. Release the PTO belt tensioner rod.*
5. Place the attachment belt onto the PTO drive pulley on the power unit. Ensure the belt is properly seated in each pulley.*
6. Engage the PTO belt tensioner rod.*
7. Wipe the attachment's hose ends clean, and connect to the power unit's hydraulic quick couplers.* If equipped, connect the hoses and quick couplers so the red indicators are paired together and the yellow indicators are paired together.
8. Connect the electric plug to the matching socket.*

Refer to attachment manual for additional details.

*Applies only if the attachment is equipped.

Detaching

1. Park the power unit on a level surface and set the parking brake.
2. Fully raise the front hitch and attachment and set the weight transfer to 0 (if equipped).
3. Lower the attachment to the ground and place the primary SDLA lever in the float position.
4. Shut off power unit engine.
5. Release the PTO belt tensioner rod.*
6. Remove the attachment belt from the PTO drive pulley of the power unit.*
7. Move the secondary SDLA lever left and right to release pressure from the auxiliary hydraulic circuit and disconnect the hydraulic quick couplers from the power unit.*
8. Disconnect the electric plug from the socket on the power unit.*
9. Lift the front hitch lever lock to release the front hitch lock lever and move the front hitch lock lever to the unlocked position.
10. Restart the power unit and slowly back away from the attachment.

Refer to attachment manual for additional details.

*Applies only if the attachment is equipped.

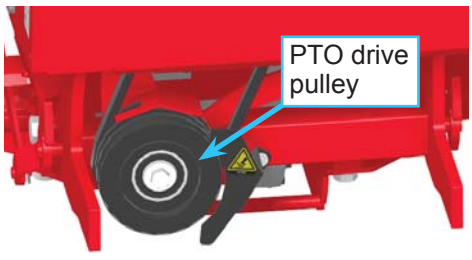
Operating Attachments

Refer to the operator's manual for each attachment for the proper operation and use of the particular attachment that is being operated.

Front Hitch

The front hitch is used to secure attachments to power unit, and to raise and lower the attachment. The front hitch is controlled by the primary SDLA lever. Pull the lever to the left to raise the attachment, push the SDLA lever to the right to lower the attachment. The primary SDLA is equipped with a 'float' position. Push the SDLA lever to the far right position until the float detent engages and stays in place to operate in float.

PTO Drive Belt & Pulley



If the attachment requires a drive belt, release the PTO belt tensioner rod and install the attachment belt around the drive pulley at the location shown above. When the belt is in place around the drive pulley, push the PTO belt tensioner rod in to engage and tighten the belt.

Front Auxiliary Couplers

⚠ CAUTION

EQUIPMENT DAMAGE!

Dirt and other debris in hydraulic system can cause damage to the system. Wipe clean the mating parts of the couplers before coupling. Use protective rubber plugs over hydraulic couplers when not in use.

If attachment requires auxiliary hydraulics, couple the attachment hoses with the front auxiliary couplers. This is done by sliding the collar of the coupler rearward and inserting the end of the attachment hose into the coupler and releasing the collar. If the collar will not snap forward on its own, pull it forward manually.

The couplers that the hoses are attached to will affect which way the secondary SDLA lever is pushed to control the action of the attachment. If the attachment is equipped with red and yellow indicators, connect the hoses and quick couplers so the red indicators are paired together and the yellow indicators are paired together. If the hoses are connected and the action is not the desired motion, then switch the hoses the couplers are attached to.

Auxiliary couplers are controlled by moving the secondary SDLA lever left or right.

NOTE: Pressure build-up in the attachment hose and the power unit couplers may occur, causing difficult installation of hoses. If hoses do not easily connect, try one or both of the following steps:

1. To release the pressure from power unit couplers, turn off engine and move the secondary lever of the SDLA right and left to release pressure in the power unit's hydraulic circuit.
2. To release pressure in the attachment hose, loosen one of the hose ends and retighten when pressure is released.

⚠ WARNING

Hydraulic fluid is under high pressure and can penetrate skin, causing injury. Keep hands, face, and body away from pinholes or nozzles that eject hydraulic fluid under high pressure.

Weight Transfer

The weight transfer system transfers weight from the attachment to the front wheels of the power unit when the front hitch is in float or assists in lifting the attachment. The operator can select different weight transfer rates using the weight transfer select lever.

To set the weight transfer, raise the front hitch to its maximum height and move the weight transfer select lever to the desired position.

Selecting the proper amount of weight to transfer depends on attachments, ground conditions and operator preference. A lightweight attachment (e.g. KA160 power blower) will not go down with full weight transfer on. With full weight transfer on, and mowing in the float position, the mower may not come down quickly enough when going through uneven terrain. Power unit speed or weight transfer rate must be reduced.

High/Low Range

⚠ CAUTION

Never shift while under load, while moving, or while on a slope. Always ensure the shift lever is secured in the lock position at the end of each shift stroke.

Always use low range when operating on slopes of greater than 15 degrees.

Low range is recommended for most pulling, pushing, and slow travel. High range is ideal for transport and light duty tasks.

1. Park the power unit on level ground and engage the parking brake.
2. Move the shift lever to the desired range position.

NOTE: occasionally the engagement of the transaxle gears is prevented by misalignment. Moving the steering wheel slightly to the right or left will move the gears enough to complete the engagement.

Turning Radius

The 4500 has three mounting positions for the steering cylinder that determine the power unit's turning radius.

1. Standard position: this position is the standard position and enables the tightest turning radius.
2. Dual wheel position: The steering cylinder must be installed in this position when operating with dual wheels. The resulting turning radius will be larger than position number 1.
3. Cab and Versa-loader position: The steering cylinder must be installed in this position when the cab is installed or when operating the Versa-loader. The resulting turning radius will be larger than position number 2.

Roll-Over Protection System

⚠ WARNING

Keep the ROPS locked in the upright position and the seat belt securely fastened during operation. Failure to do so could result in serious injury or loss of life.

The 4500 is equipped with a fold down ROPS that allows the power unit to access areas of low overhead clearance. Lower the roll bar only when absolutely necessary and raise the roll bar to the upright position as soon as clearance allows.

⚠ WARNING

Do not wear a seat belt when the roll bar has been lowered to the down position.

To lower the roll bar:

1. Remove the pins from the right and left hinge plates (1).
2. Fold the roll bar down and install the pins in the hinge plates (2) to lock in place.

1. Locked Upright

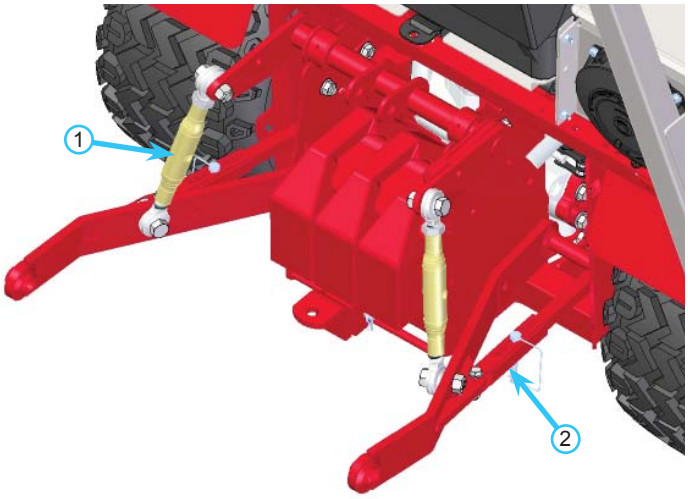
2. Locked Folded Down

To raise the roll bar:

1. Remove the pins from the right and left hinge plates (2).
2. Raise the roll bar to the upright position and install the pins in the hinge plates (1) to lock in place.

3 Point Hitch (Optional Accessory)

Some light and medium duty implements (non-PTO powered) can be used on the rear of a 3 point hitch equipped power unit.



1. Lift Link
2. Stabilizing Link

The 3 point hitch is equipped with adjustable lift links (1) to control the individual draw bars. The stabilizing links (2) can be allowed to swing freely or can be locked at a desired position.

The 3 point hitch is equipped with three control handles. The inside handle raises and lowers the draw bar. The middle handle controls the left rear set of hydraulic quick couplers. The outside handle controls the right rear set of hydraulic quick couplers.

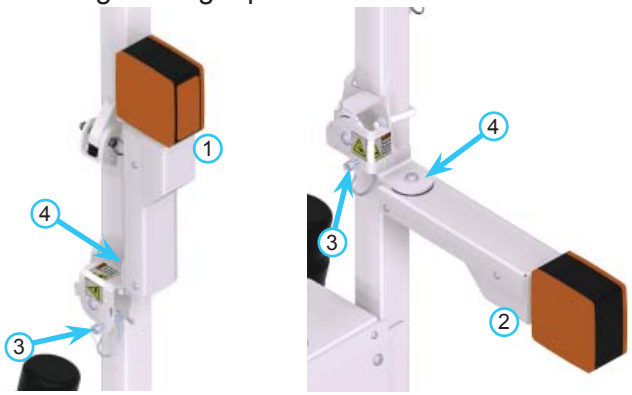
12 Volt 4-Pin Auxiliary Outlets (Optional Accessory)

Certain attachments require a 12 volt auxiliary outlet. Plug the attachment's 12 volt power cord into the 12 volt 4-pin outlet. The actions of the front 12 volt outlet are controlled by an on/off switch and two momentary on buttons on the SDLA handle. The actions of the rear 12 volt outlet are controlled by an on/off switch and a momentary on/off/on switch on the panel behind the SDLA control. The momentary buttons or switch are used for controlling movement that is only used for a brief time. The on/off switches are used to activate equipment or select different functions.

Directional/Hazard Flasher Operation (Optional Accessory)

The directional signal / hazard flasher lights are mounted on adjustable arms. They can be positioned with the arms up for standard use, or the arms can be rotated down for use on power units equipped with dual wheels.

To change the light position:



1. Standard Position
2. Dual Wheel Position
3. Lock Pin
4. Pivot Friction Washer

1. Remove the lock pin (3).
5. Move the arm to the desired position.
6. Lock arm in place with the pin.

The light arm is mounted to the pivot bracket using a friction washer that allows the light to pivot forward or backward when it contacts an object (4).

If the light arm gets knocked out of position, manually move the arm back into alignment.

Suspension Seat Weight Adjustment (Optional Accessory)

The optional suspension seat can be adjusted for the operator's weight.

1. Park the power unit on a level surface.
2. Engage the parking brake.
3. With the operator sitting on the seat, turn the knob (A) on the front of the seat clockwise to increase the amount of suspension for a heavier operator. Turn the knob on the front of the seat counterclockwise to reduce the amount of suspension for a lighter operator. Adjust the seat until a comfortable amount of suspension is found.

Operating On Slopes

⚠ WARNING

AVOID PERSONAL INJURY!

- Operation on slopes decreases power unit stability and increases the potential for unexpected difficulties. Only experienced operators should operate the power unit on slopes and extra caution should be exercised.
- Use low range when operating on slopes greater than 15 degrees.
- Never shift between high and low range while on a slope. Always move the machine to level ground and place the selector lever in park before shifting range.
- Avoid uneven, loose, or wet terrain.
- Stay clear of drop-offs, holes, ditches, rocks, or objects that could cause a sudden and/or unexpected force on the power unit.
- Make slow and cautious starts, stops, and turns.
- Do not exceed the maximum degree of operation. Refer to illustrations.
- Turn downhill when possible and/or reduce the degree of turns.
- Assure a sufficient supply of fuel for continuous operation. A minimum of one-half tank of fuel is recommended.
- Failure to follow items listed or to use common sense while operating on slopes can result in injury or death. Always operate on slopes with caution.

⚠ CAUTION

Maximum angle of operation for the engines in the 4500 power units*.

- Vanguard Model 54: 20° continuous, 30° intermittent^
- Kawasaki FD851D: 30° continuous
- Kubota WG972-GL: 20° continuous, 30° intermittent^
- Kubota D902: 20° continuous, 30° intermittent^

*Attachments, accessories, and tire configuration may reduce the 4500 power unit's maximum angle of operation. Refer to applicable operator's manuals for maximum angle of operation of the equipment.

^Intermittent: The engine may operate between 20° and 30° for up to 10 minutes. If 10 minutes is reached, the engine must be returned to 20° or less to assure proper oil lubrication. After returning to 20° or less, the intermittent cycle can be repeated.

Maintain sufficient fuel in tank to ensure continuous operation.

Cease operation if power unit stability is questionable, or if the operator is uncomfortable or unsure of continuing safely.

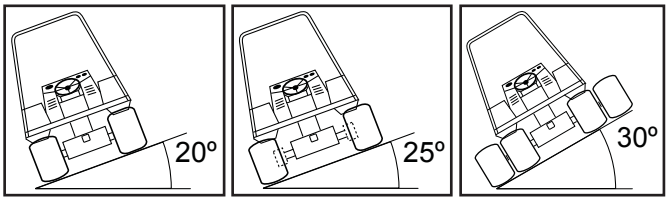
Attachments can affect the stability of the power unit. Each attachment will affect the power unit differently.

Increase the amount of weight being transferred to the power unit from the attachment while operating on slopes. Refer to Weight Transfer section.

Always operate carefully and in a manner that does not compromise safety.

Always keep the roll bar in the upright, locked position and fasten yourself securely with the seat belt!

Refer to following illustrations for power unit capability with different equipment options.



Single Tires | 3" Wheel Extensions | Dual Wheels

Model	Single Tires	Wheel Extensions	Dual Wheels
	Any Direction	Any Direction	Any Direction
4500	20°	25°	30°
4500Z with Propane	15°	20°	25°

Towing Or Pushing The Power Unit

⚠ Attention

Avoid damage to your power unit! Before towing, read and understand the information below. Severe damage will occur to unit if proper towing procedure is not followed.

⚠ CAUTION

Failure to place the transaxles in neutral when towing or pushing the power unit may result in damage to the power unit drivetrain.

If the power unit needs to be moved without the engine running, it is important to remember to place the transaxles in neutral by shifting the high/low range shift handle to the middle of the shift stroke. With the transaxles in neutral and the parking brake disengaged, the power unit can freewheel. Use extreme caution when towing or pushing the power unit; steering may not function. Do not exceed 5 mph (8 km/h).

⚠ WARNING

Always set the parking brake, shut off power unit engine, remove the ignition key, and ensure all moving parts have come to a complete stop before inspecting components or attempting any repair or adjustment.

⚠ Attention

If any component requires replacement, use only original Ventrac replacement parts.

Service And General Maintenance

Proper and timely service of this power unit is critical to keep the power unit in a safe and reliable operating condition. Follow the maintenance schedule at the end of the service section. For convenience, a frequent service guide decal and a quick reference chart decal have been placed on the power unit under the hood.

Cleaning And Appearance Care

For best results, and to maintain the finish of the power unit, clean or wash the power unit to remove accumulated clippings, leaves, dirt, gravel, and salt deposits when the job is finished.

⚠ Attention

To maintain the finish of the power unit, thoroughly wash the equipment after each use to remove any corrosive agents (e.g. salt). Failure to clean the equipment may result in corrosion of (including but not limited to) steel, aluminum, and electrical components. Equipment that will experience repeated exposure to corrosive agents should be pretreated with a corrosion preventative.

⚠ CAUTION

If the engine has been running, it must be allowed to cool in order to prevent damage to the block and exhaust manifold.

Do not direct high pressure water at the engine, air cleaner, muffler, radiator, hydraulic oil cooler, or any electrical components.

Allow the power unit and all components to cool before washing. Refer to the specific service sections for proper cleaning techniques for the engine, radiator, and hydraulic oil cooler. Use mild soap and water to clean the power unit. Harsh chemical cleaners could cause damage to the finish or components.

It is necessary to periodically remove the lower rear frame cover and blow out or wash out any accumulated debris.

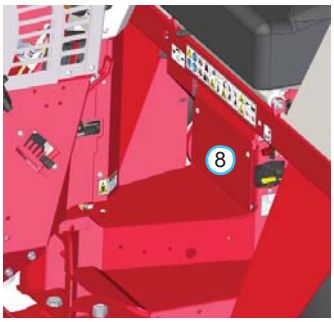
After cleaning, use touch up paint to repair scrapes.

Service Access Points

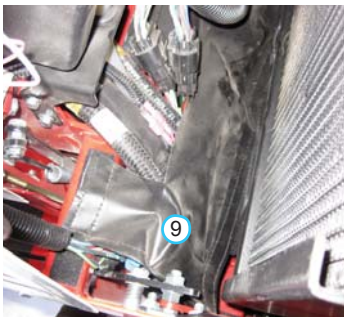
Throughout the service section, different access points are referred to. The following list and images identify shields and covers that may need to be removed or opened during service.

1. Engine Hood
2. Pump Cover
3. Right Pump Access Cover
4. Right Engine Access Panel

5. Left Engine Access Panel
6. Hydraulic Filter Access Cover
7. Seat



8. Lower Rear Frame Cover



9. Debris Barrier

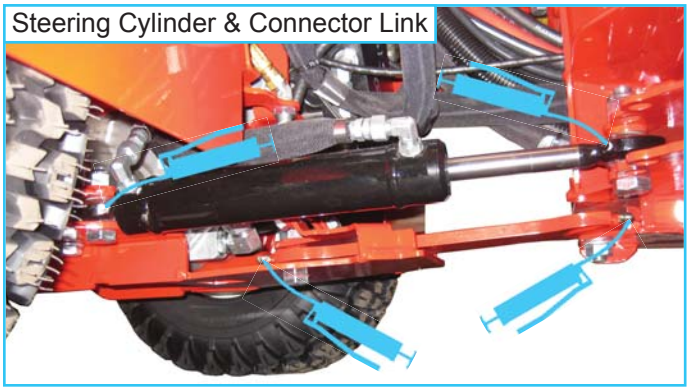
Lubrication Locations

Lubrication is required at the following locations. Refer to the maintenance schedule for service intervals and amount of grease.

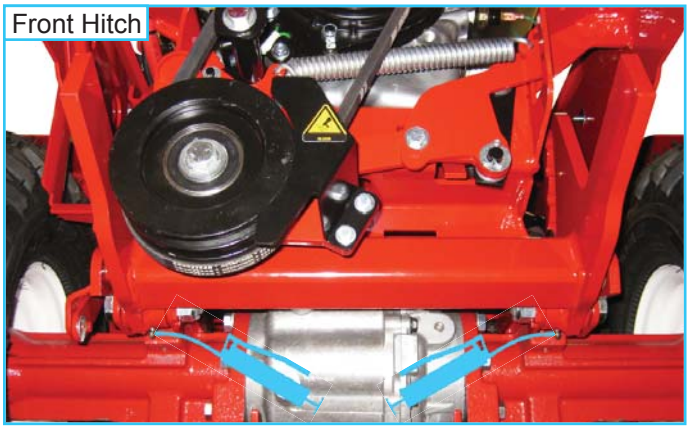
Grease

Spray Lube

Steering Cylinder & Connector Link

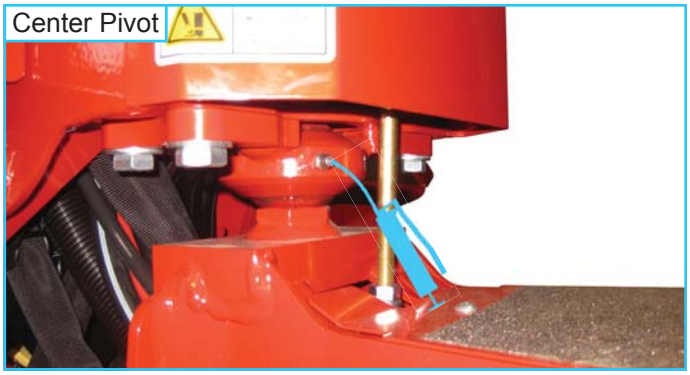


Front Hitch

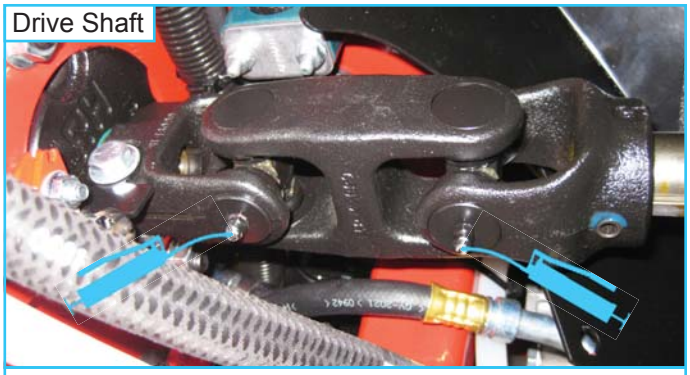


Lift Cylinder

Center Pivot

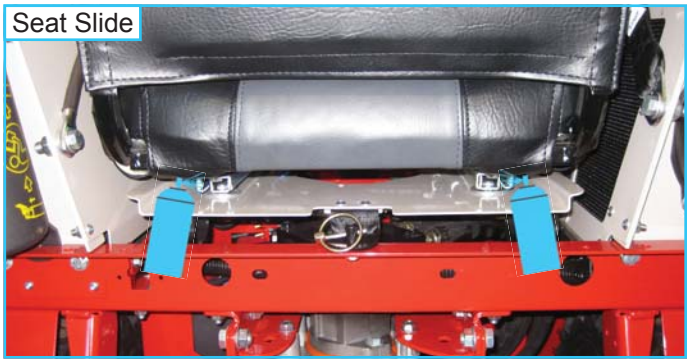


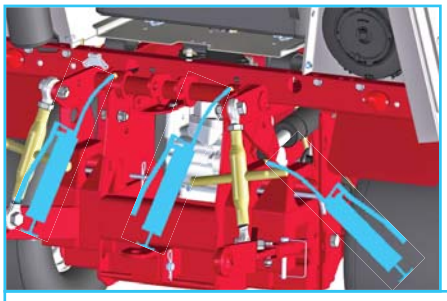
Drive Shaft

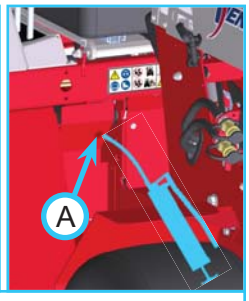


On the 4500K, the drive shaft can be greased through access points in the drive shaft cover. On all other models, the front fitting can be reached in front of the radiator and the rear fitting can be reached in back of the radiator, after pulling back the canvas debris barrier.

Seat Slide







The front grease fitting on the 3 point cylinder can be greased through an access hole (A) in the right foot platform panel.

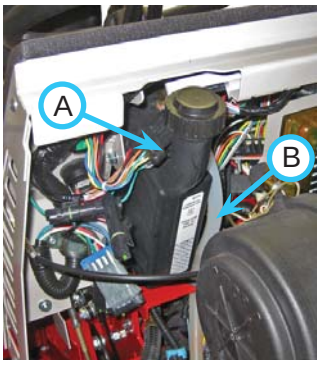
Checking Hydraulic Oil Level

Check the hydraulic oil level when the hydraulic system is cold, prior to operating the power unit. If the hydraulic system is warm, allow one hour for the hydraulic system to cool before checking the oil level. Checking the oil level when the hydraulic system is warm will produce an inaccurate oil level reading.

Attention

After connecting a new attachment or kit that runs off the power unit's hydraulic system, run the attachment through a complete cycle, then stop and check the hydraulic oil level.

1. Park the power unit on a level surface and adjust the steering to aim the power unit straight ahead.
2. Fully raise the front hitch and lower the 3-point hitch (if equipped).
3. Engage the parking brake and shut off the engine.
4. Remove the key from the ignition switch and allow time for the hydraulic system to cool.
5. The hydraulic oil tank (A) is located under the hood and dash.
6. Check the oil level in the plastic sight tube (B) next to the hydraulic oil tank. The oil level should be within the proper range indicated by the oil level decal on the hydraulic oil tank.

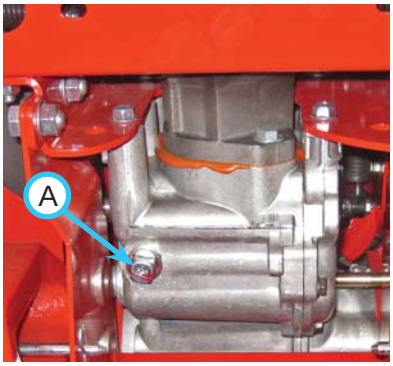


7. If the hydraulic oil level is below the low mark on the decal, add HydroTorq XL synthetic hydraulic oil until the proper level is reached.

Checking Rear Transaxle Oil

Check the rear transaxle oil level when the oil is cold, prior to operating the power unit.

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the rear weights from the hitch bar (if equipped).
4. Remove the oil fill plug (A) from the transaxle and check to see if the oil level is even with the bottom of the oil fill hole.



5. If the oil level is low, add HydroTorq XL synthetic hydraulic oil until level with the bottom of the oil fill hole.
6. Reinstall the rear weights (if equipped).

Changing Hydraulic Oil And Filters

The hydraulic oil and filters should be changed by an authorized Ventrac dealer only. Refer to the maintenance schedule for service intervals.

Servicing Closed Loop Hydrostatic Drive Circuit

Service or repair of the closed loop drive circuit must be performed by an authorized Ventrac dealer.

If any part of the closed loop hydrostatic drive circuit (pump, front drive motor, rear drive motor, or any of the three 1/2" hydraulic lines connecting them together) is serviced or replaced, the Ventrac closed loop drive circuit filtration procedure must be performed. This procedure requires a special Ventrac remote filtering tool and must be performed by a Ventrac authorized technician.

Servicing Hydraulic Oil Cooler

1. Brush dirt and debris from the oil cooler screen in the right fender.
2. With the ignition key turned to the run position, flip the oil cooler fan switch from "auto" to "reverse" operation to blow dust off the oil cooler fins.
3. Place the fan switch back in the "auto" position.

Checking Engine RPM

Check engine RPM when engine is warmed up and not under load. Observe tachometer:

- Kubota gas low idle speed = 1500 ±50 RPM
- Kubota diesel low idle speed = 1500 ±50 RPM
- Kawasaki low idle speed = 1550 ±50 RPM
- Vanguard low idle speed = 1550 ±50 RPM
- High idle speed (all engines) = 3600 ±50 RPM

If engine RPM is incorrect, contact your local Ventrac dealer.

Checking Engine Oil Level

Attention

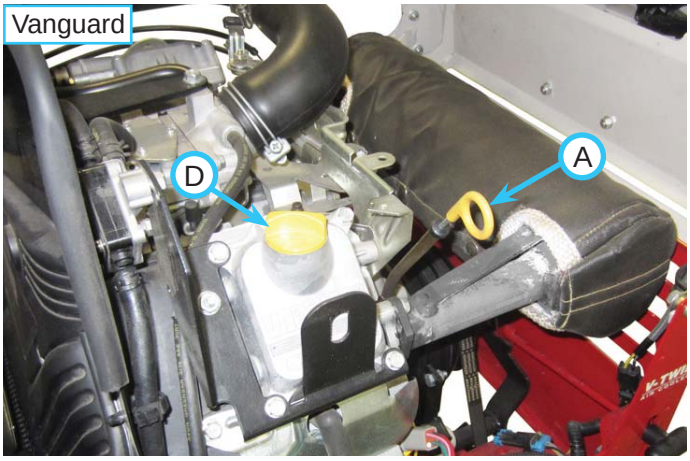
Avoid Engine Damage!

Failure to check the oil level regularly could lead to serious damage to your engine, if the engine is run with an incorrect oil level.

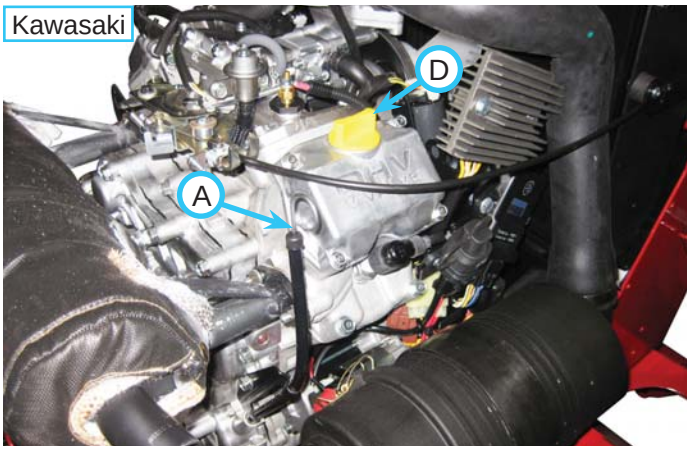
- Check the engine oil level with the power unit sitting on a level surface and with the engine shut off and the oil cold.
- Keep oil level between the **FULL** and **ADD** marks.
- Do not add oil with the engine running.

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch and allow the engine and oil to cool.
4. Open the engine hood to access the engine compartment.
5. Remove the oil dipstick (A) from the engine and wipe with a clean cloth.

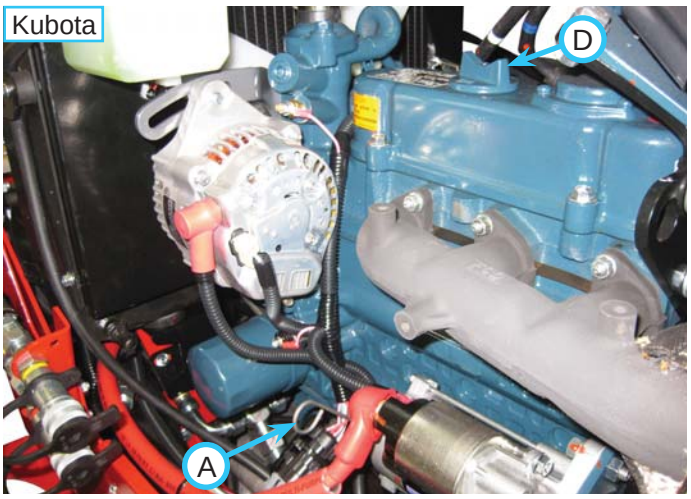
Vanguard



Kawasaki

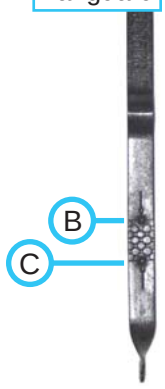


Kubota

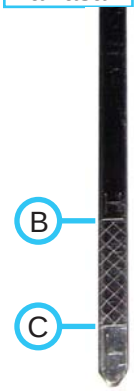


6. Insert the dipstick back into the engine and remove again.
7. Check the oil level. The level should be between the Full (B) and Add (C) marks on the dipstick.

Vanguard



Kawasaki



Kubota

8. If the oil level is low, remove the oil fill cap (D) and add small amounts of engine oil to bring the oil level no higher than the Full (B) level on the dipstick.
9. If oil level is above the Full (B) mark, drain some engine oil to achieve the proper level.
10. Reinstall the dipstick and the oil fill cap and close the engine hood.

Changing Engine Oil And Filter

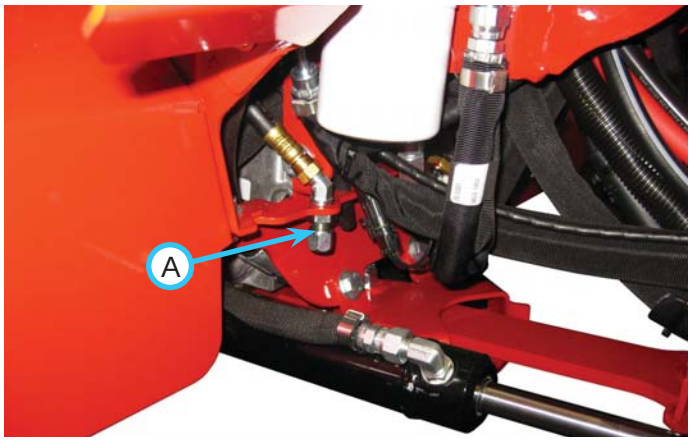
⚠ CAUTION

Contact with engine oil can irritate your skin. Wear protective gloves when working with engine oil. If you come in contact with engine oil, wash it off immediately.

⚠ CAUTION

Oil is hazardous to the environment. Drain engine oil into an approved container. Dispose of used engine oil in accordance with local laws.

1. Start the power unit engine and allow it to run until the engine reaches operating temperature.
2. Park the power unit on a level surface.
3. Engage the parking brake and shut off the engine.
4. Remove the key from the ignition switch.
5. Open the engine hood to access the engine compartment.
   NOTE: removal of the right or left engine access panel may allow easier removal and installation of the engine oil filter.
6. Place a drain pan underneath the oil drain (A) located in front of the hydraulic oil filters on the left side of the power unit.

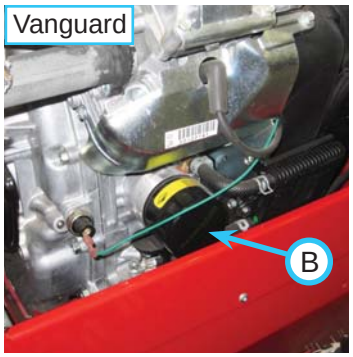


⚠ WARNING

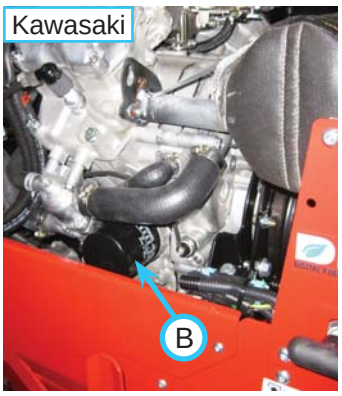
Hot engine oil can cause severe burns. Allow the engine temperature to drop from hot to warm before draining the oil.

7. Remove the drain cap from the oil drain and drain into the pan while the oil is warm.
8. Remove the oil filter (B) located on the side of the engine. Turn the filter counter-clockwise to remove.
9. Wipe the filter mounting surface with a clean cloth.

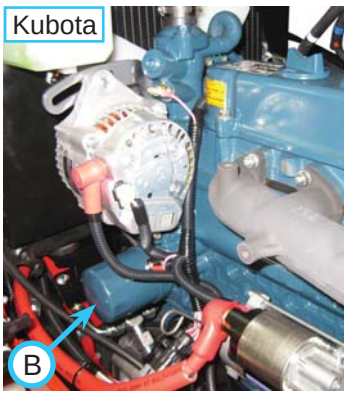
Vanguard



Kawasaki



Kubota



10. Apply a thin film of clean oil to the gasket of the new oil filter.
11. Install the new filter turning it clockwise until the gasket makes contact with the mounting surface. Tighten the filter 1/2 to 3/4 turn more by hand.
12. Install the drain cap onto the oil drain. DO NOT over-tighten.
13. Remove the oil fill cap.
14. Add oil to the engine. (Refer to Engine Owner's Manual for proper oil specifications and capacity.)
15. Install the oil fill cap and wipe up any oils spills.
16. Start the engine and run at slow idle for approximately 2 to 3 minutes.
17. Shut off the engine and remove the ignition key.
18. Check for oil leaks around the oil filter.
19. Check the engine oil level after allowing the engine to cool for approximately 2 minutes. Add oil, if necessary.

Changing Air Filter Elements

⚠ CAUTION

When the air filter elements are removed, an opening is created to the internal parts of the engine.

Be sure nothing falls into the canister that could make its way into the engine. Have the new filter elements ready to install immediately after removing the old filter elements.

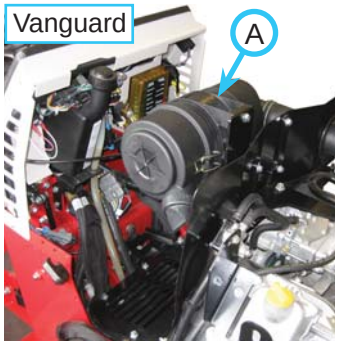
⚠ Attention

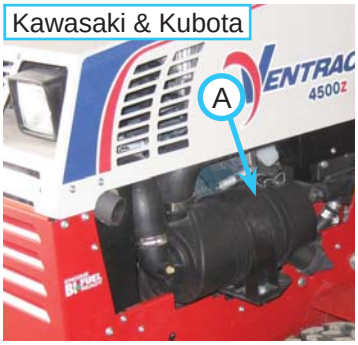
Avoid damage to your engine!

Improper service to the engine air filter can result in severe engine damage.

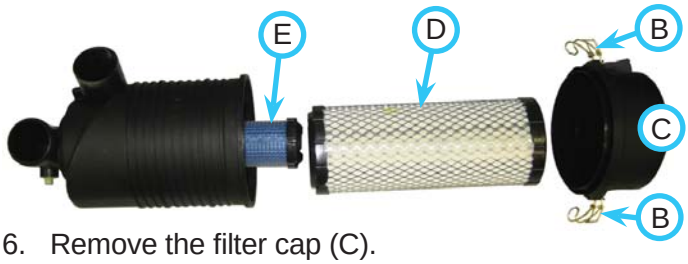
- Inspect filter daily in extreme heat, dust, or other severe conditions.
- Never run the engine without a proper air filter installed.
- Never wash or clean the paper filter element.

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch and allow the engine to cool.
4. Locate the engine air cleaner assembly (A).





5. Release both latches (B) on the filter assembly and unhook the latches from the filter housing.



6. Remove the filter cap (C).
7. Remove and discard the primary air filter element (D).
8. If the safety air filter element (E) is scheduled for replacement, remove and discard the safety air filter element.
9. Install the new air filter element(s).
10. Install the filter cap and fasten both latches.

Filling The Fuel Tank

⚠ DANGER

Fuel is flammable and/or explosive. Follow all safety instructions in the Fuel Safety section of this manual and in the engine operator's manual.

⚠ WARNING

Long term exposure to fuel vapors can cause serious injury or illness. Avoid prolonged breathing of fuel vapors.

If fuel is spilled on skin or clothing, change clothing and wash affected skin immediately.

⚠ CAUTION

Avoid damage to your engine!

Only use fuel that meets the specifications required for your engine. Refer to the engine operator's manual for the proper grade and specifications of fuel for your engine.

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch and allow the engine to cool.
4. The fuel tank cap is located on top of the left rear fender. Wipe any dust and dirt off the fuel cap to prevent dirt from falling into the fuel tank, and remove the fuel cap.
5. Add fuel to the tank until the fuel level reaches the bottom of the fuel neck. Do not overfill. Keep the fuel nozzle in contact with the rim of the fuel neck until fueling is completed.
6. Replace the fuel cap and tighten until it clicks.
7. Wipe up any fuels spills and allow fuel vapors to dissipate before starting the engine.

Changing The Propane Cylinder(s)

⚠ DANGER

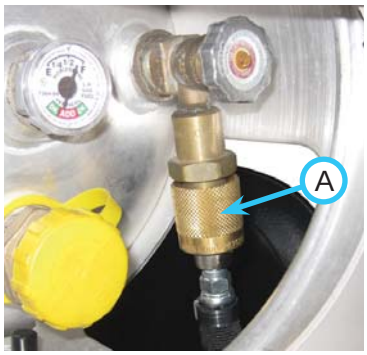
Propane is flammable and/or explosive. Follow all safety instructions in the Propane Safety section of this manual and in the engine operator's manual.

⚠ WARNING

Do not breathe propane vapors.

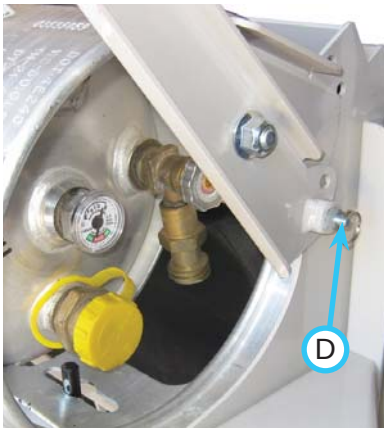
Contact with escaping vapors or liquid may cause freezing of tissue or frostbite. Seek immediate medical attention if contact occurs with propane vapors or liquid.

1. Park the power unit on a level surface in a well ventilated area.
2. Engage the parking brake.
3. Close the liquid withdrawal valve on both of the propane cylinders.
4. Purge the propane from the hoses by allowing the engine to run until it stops.
5. Turn the ignition key to the Off position and remove the key from the ignition switch.

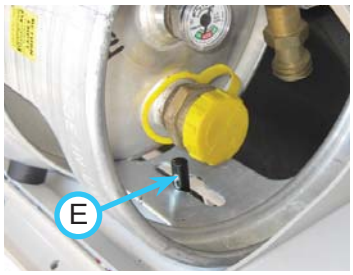


6. Carefully disconnect the LPG hose connector (A) from the propane cylinder.
7. Remove the 2) safety snap pins (B) that secure the cylinder retainer (C).

8. Pull out on the spring plunger pin (D) to release the cylinder retainer and raise the retainer until the spring pin snaps into the latch hole.



9. Remove the empty cylinder from the tank support.
10. Inspect the filled propane cylinder. If the cylinder is dented, gouged, bulging, or corroded, it must be removed from service and replaced.
11. Inspect the filled cylinder valve and the LPG hose connector for dirt, debris, or damage.
12. Inspect the LPG hose connector to ensure the o-ring is not damaged or missing.
13. Place the filled propane cylinder onto the tank support, with the valve on the right side of the power unit and the locating pin (E) on the tank support through the locating slot on the propane cylinder.



14. Pull out on the spring plunger pin to release the cylinder retainer and lower the retainer until the spring pin snaps into the latch hole.
15. Install safety snap pins into the lock holes on each side of the cylinder retainer.
16. Thread the LPG hose connector onto the propane cylinder and hand tighten.
17. Open the liquid withdrawal valve on the propane cylinder.

Checking The LPG System For Leaks

⚠ WARNING

Never check for leaks using an open flame.

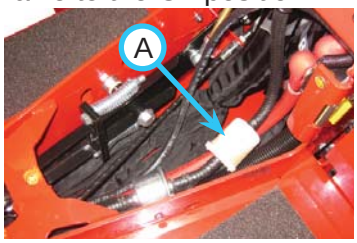
Never use bare hands when checking fittings and valves. Escaping propane vapor or liquid freezes skin on contact.

1. With the engine running at low idle, use a soap solution to check for leaks at all connections between the propane tanks and the dual fuel carburetor. Bubbles will indicate a loose connection.

2. After the engine has warmed up to operating temperature, check for leaks in the water lines from the vaporizer to the thermostat and the intake.
3. If any leaks are found, tighten the connections and retest. Repeat until there are no leaks for propane or coolant.

Changing The In-line Fuel Filter

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Turn the fuel shut-off valve to the Off position.
5. Remove the lower rear frame cover.
6. Loosen the hose clamps and remove the fuel filter (A).



7. Install the new fuel filter with the flow arrow pointing toward the engine and fasten securely with the hose clamps.
8. Turn the fuel shut-off valve to the On position.
9. Inspect fuel filter hose connections for leaks.
10. Reinstall the lower rear frame cover.

Priming The Fuel System

1. Turn the ignition key to the On position for about 30 seconds. The operator should hear the fuel pump operating.
2. Start the power unit. Repeat step 1 if necessary.

Fuel Care for 4500Z with Propane Option

1. If engine is operated on both propane and gasoline, but the gasoline is kept fresh (used and replaced with fresh gasoline at a minimum of every 30 days), no additional steps are necessary.
2. If engine is operated primarily on propane, but occasionally is switched to gasoline, keep a minimum of 2 gallons (7.5 L) of gasoline with an added fuel stabilizer (i.e. Briggs & Stratton Quick Start or PRI-G).
   Run the engine on gasoline for 10 minutes to allow the fuel treatment to travel all through the fuel system.
   Every 6 months, switch the engine to run on gasoline until the old gasoline is used, then replenish with fresh, treated gasoline.
3. If engine is operated solely on propane with no intention of using gasoline, drain all fuel out of the fuel tank, start the power unit, and allow to run until the engine stops to ensure all fuel is out of the fuel lines, carburetor passages, injectors, etc.

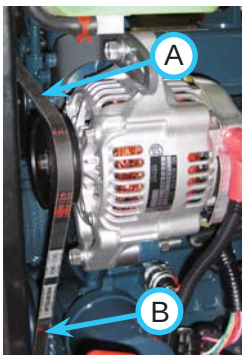
Checking The Fan (Alternator) Belt (Kubota Engines)

⚠ WARNING

Avoid Personal Injury!

Fingers or loose clothing can get caught in rotating parts. Shut off the power unit engine, remove the ignition key, and wait for all moving parts to stop rotating before working on the power unit.

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch and allow the engine to cool.
1. Turn the battery disconnect switch to the Off position.
2. Open the engine hood to access the engine compartment.
3. Check the fan belt (A) for excessive wear, cracks, or damage. Replace if necessary.



4. Check the fan belt for proper tension. Depress the belt halfway (B) between the drive pulley and the alternator pulley and measure the belt deflection at the specified force 22 lbf (98 N, 10 kgf). The belt deflection should measure .28 to .35 inches (7 to 9 mm). If the belt deflection is not within specifications, the belt tension must be adjusted.

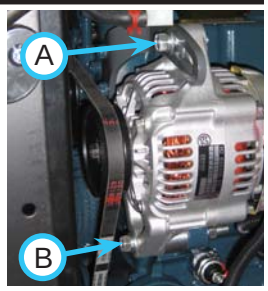
Adjusting Fan (Alternator) Belt Tension (Kubota Engines)

⚠ WARNING

Avoid Personal Injury!

Fingers or loose clothing can get caught in rotating parts. Shut off the power unit engine, remove the ignition key, and wait for all moving parts to stop rotating before working on the power unit.

1. Turn the battery disconnect switch to the Off position.
2. Loosen the alternator adjustment bolt (A).
3. Loosen the bottom alternator mounting bolt (B).
4. Move the alternator in the desired direction.

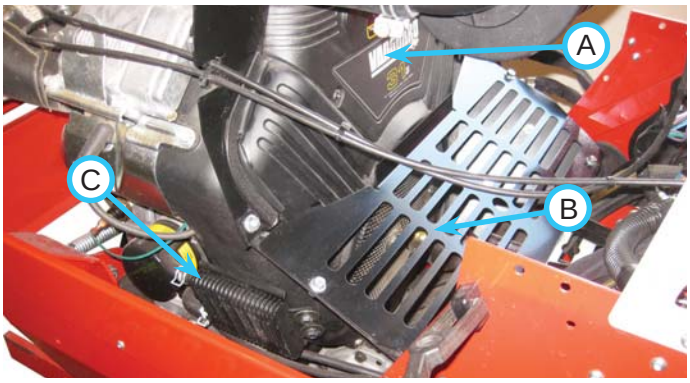


5. Tighten the alternator adjustment bolt.
6. Tighten the bottom alternator mounting bolt.
7. Recheck the belt for proper tension.

Cleaning Engine Compartment & Engine

Clean the engine compartment and engine daily or prior to each use, to reduce the risk of engine overheating or ignition of accumulated debris.

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch and allow the engine to cool.
4. Open the engine hood to access the engine compartment.
5. Remove accumulated debris and dust from the engine compartment and engine.
6. **Liquid Cooled Engines:** refer also to Cleaning The Radiator And Screen section of this manual
7. **Air Cooled Vanguard Engine:**
   a. Remove the front panel (A) from the engine to clean around the carburetor and linkage.



   b. Remove the drive shaft cover (B) and clean debris from the rotating screen.
   c. Clean the oil cooler (C) using a brush or compressed air to remove dust and debris.

Servicing The Cooling System

⚠ WARNING

Avoid Personal Injury!

If the unit has been running, the radiator and radiator coolant will be hot and can burn skin! Built-up pressure in the radiator can cause an explosive release of coolant if the radiator cap is removed:

- Shut off engine and allow to cool.
- Do not remove the radiator cap unless the radiator and engine are cool enough to touch with bare hands.
- Slowly loosen cap to the first stop to release all the pressure before removing completely.

⚠ WARNING

Avoid Personal Injury!

Wear personal protective equipment to protect eyes and hands when opening radiator cap to protect against the pressure in the radiator.

If coolant is spilled on skin or clothing, change clothing and wash affected skin immediately.

⚠ CAUTION

Coolant is poisonous to humans and animals and is hazardous to the environment. Drain coolant into an approved container. Dispose of used coolant in accordance with local laws.

⚠ Attention

Avoid damage to your engine!

Using incorrect coolant mixture and/or type can cause engine damage. See the Engine Owner's Manual for correct type.

- Do not operate engine without coolant.
- Do not use plain water only, you must use a mixture of water and antifreeze.
- Do not pour coolant into radiator when engine is hot.
- To prevent engine overheating, do not exceed more then 50% antifreeze in cooling system.

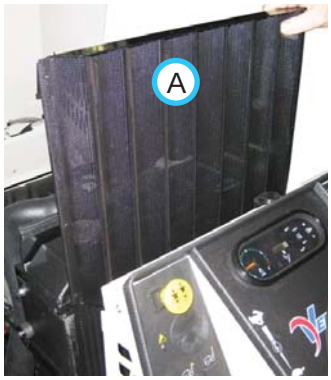
Checking The Cooling System

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch and allow the engine to cool.
4. Open the engine hood to access the engine compartment.
5. Check the coolant level in the coolant recovery tank (A). When cold, the coolant recovery tank should be approximately half full of coolant.

6. If the coolant level is low, add coolant to the tank and reinstall the cap.
7. If the coolant recovery tank is empty, slowly open the radiator cap (B) to the first stop to allow any pressure to release. Press down on the cap slightly and continue to turn counterclockwise to remove the cap from the radiator.
8. Check to ensure the coolant level is up to the bottom of the filler neck.
9. If the coolant level is low, add coolant to the radiator until it reaches the bottom of the filler neck.
10. Install the radiator cap.
11. Inspect the radiator hoses and clamps for leaks and deterioration. Replace as necessary.
12. Close the engine hood.

Cleaning The Radiator And Screen

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch and allow the engine to cool.
4. Open the engine hood to access the engine compartment.
5. Remove the radiator screen (A).
6. Remove debris from the radiator screen using a brush, compressed air, or water.
7. When required, clean debris from the radiator using low pressure compressed air or water.
8. Check radiator fins for damage.
9. Install the radiator screen.
10. Close the engine hood.

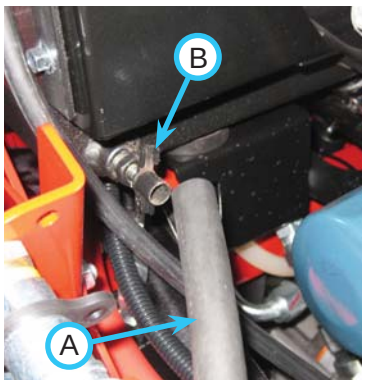


Draining The Cooling System

⚠ CAUTION

Coolant is poisonous to humans and animals and is hazardous to the environment. Drain coolant into an approved container. Dispose of used coolant in accordance with local laws.

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch and allow the engine to cool.
4. Open the engine hood to access the engine compartment.
5. Slowly open the radiator cap to the first stop to allow pressure to release.
6. Place a drain pan or jug under the right side of the front frame.
7. Install a 7/16” (11 mm) ID hose (A) onto the radiator drain port (B) and route down to the drain pan.
8. Turn the drain valve counterclockwise to open and drain the coolant into the drain pan.



Flushing The Cooling System

1. Drain the cooling system following the procedures in the previous section.
2. Close the radiator drain valve, leaving the drain hose in place.
3. Add one can of radiator flush to the radiator and fill the radiator with clean water.
4. Install the radiator cap, start the engine, and run until the engine reaches operating temperature (160 - 180 degrees).
5. Shut off the engine and remove the key from the ignition switch.

⚠ WARNING

Hot coolant can cause severe burns. Allow the temperature of the radiator to drop from hot to warm before draining the coolant.

6. Carefully drain the cooling system while the coolant is still warm.
7. Allow the engine and radiator to cool completely.

⚠ CAUTION

Allow engine and radiator to cool completely. Engine damage could occur if cold water is added to a hot engine.

8. Add clean water to the radiator and allow the water to run through the system. Add more water as needed, until the water flowing from the drain valve is clear and free of sediment.
9. After the water has drained completely, close the radiator drain valve and remove the drain hose.
10. Slowly add the proper coolant (refer to Engine Owner's Manual for the correct type of coolant) to the radiator until the level reaches the bottom of the filler neck. NOTE: residual water may be present in the engine. Adjust the coolant mixture to achieve a 50/50 ratio.
11. Install the radiator cap, start the engine, and run until the engine reaches operating temperature (160 - 180 degrees).
12. Shut off the engine and allow the engine to cool.
13. Recheck the coolant level when the engine is cold. Add additional coolant if necessary.
14. Close the engine hood.

Servicing The Battery

⚠ DANGER

The battery produces a flammable and explosive gas. The battery may explode.

- Wear eye protection and gloves.
- Do not smoke near the battery.
- Keep arcs, sparks, and open flames away from batteries.
- Do not allow direct metal contact across the battery posts.
- Remove the negative battery cable first when disconnecting the battery.
- Install the negative battery cable last when connecting the battery.

⚠ WARNING

Avoid Personal Injury!

Battery electrolyte contains sulfuric acid. It is **poisonous** and can cause **severe chemical burns.**

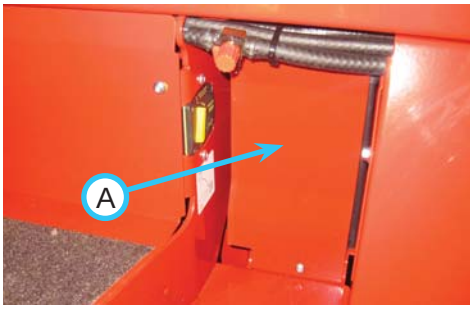
- Wear eye and skin protection.
- Keep skin protected.
- If battery electrolyte is spilled on skin or clothing, change clothing and wash affected skin immediately. Seek medical attention, if necessary.
- If battery electrolyte is splashed in eyes, flush immediately with water for 15-30 minutes and seek immediate medical attention.
- If battery electrolyte is swallowed, get medical attention immediately. Drink large quantities of water, followed by Milk of Magnesia, beaten egg, or vegetable oil. DO NOT give fluids that would induce vomiting.

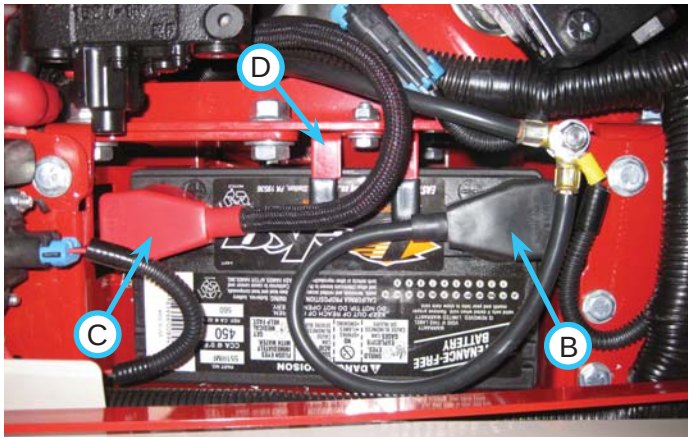
⚠ CAUTION

Batteries contain poisonous and hazardous substances. Dispose of used batteries in accordance with local laws.

Removing The Battery

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Tilt the seat forward and fasten in place with the seat prop.
5. Remove the left foot platform panel (A).
6. Disconnect the negative (-) battery cable (B).





7. Disconnect the positive (+) battery cable (C).
8. Remove the battery retainer (D).
9. Slide the battery out of the battery compartment.

Installing The Battery

1. Slide the battery into the battery compartment with the negative post to the rear.
2. Install the battery retainer and torque the bolt to 210 in-lbs (24 Nm).
3. Install the left foot platform panel. Torque bolt to 100 in-lbs (11 Nm).
4. Connect the positive battery cable to the positive battery post first.
5. Connect the negative battery cable to the negative battery post last.
6. Apply dielectric grease to the battery terminals to prevent corrosion.
7. Place the covers back over the battery terminals.

Cleaning The Battery And Terminals

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Tilt the seat forward and fasten in place with the seat prop.
5. Disconnect and remove the battery.
6. Wash the battery with a solution of four tablespoons of baking soda to 1 gallon (3.8 L) of water. Be careful not to get the soda solution into the cell.
7. Rinse the battery with clean water and dry.
8. Clean the battery posts and battery cable terminals with a wire brush.
9. Install the battery back into the power unit.
10. Apply dielectric grease to the battery terminals to prevent corrosion.
11. Place the covers back over the battery terminals.

Charging The Battery

⚠ DANGER

Batteries produce explosive gases. Charge the battery in a well ventilated space where the gases produced by charging can dissipate. Do not charge where the battery could be exposed to sparks, open flames, or other sources of ignition.

Never charge a frozen battery, as it may explode. Allow the battery to warm up and inspect for cracks or damage before charging.

To preserve optimum battery performance and life, do not allow the battery to stand in a discharged state for long periods of time. If the battery is not being used, check the battery voltage every 30 days and recharge the battery if the voltage drops to 12.4 volts or lower.

Keep the battery fully charged in cold weather to prevent damage due to freezing.

1. If possible, remove the battery from the power unit before charging.
2. Refer to the battery charger's manual for specific charging instructions.
3. If electrolyte is expelled or excessive gassing occurs, or if the temperature of the battery exceeds 125° F (52° C), charging must be temporarily stopped to permit cooling. After cooling, reduce the charging rate before starting the charger again.

Jump Starting Procedure

⚠ DANGER

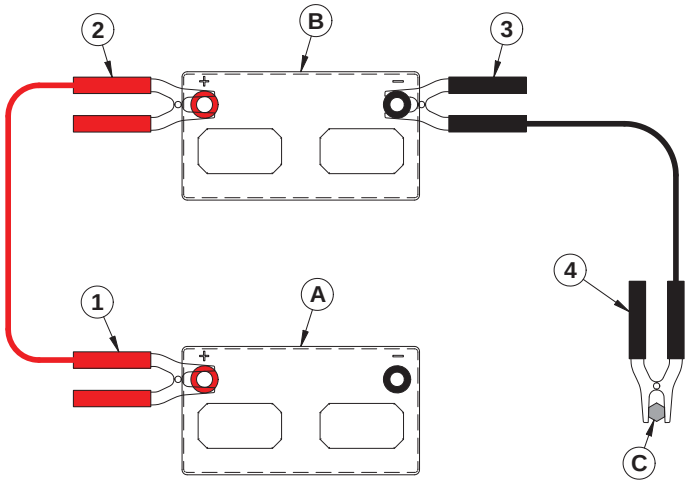
The battery produces a flammable and explosive gas. The battery may explode.

- Wear eye protection and gloves.
- Do not jump start a cold or frozen battery. Allow the battery to warm up and inspect for cracks or damage.
- Do not jump start a cracked or damaged battery.
- Do not attempt to jump start the power unit using a battery of a different voltage.

1. Inspect the discharged battery for terminal corrosion and loose connections. Clean terminals and tighten connections prior to jump starting.
2. Make sure the vehicle used to jump start the power unit has a 12 volt, negative ground, electrical system.
3. Pull the boosting vehicle up close to the disabled power unit. Be sure the vehicles do not touch.
4. Shut off the boosting vehicle's engine and set the parking brake.

⚠ CAUTION

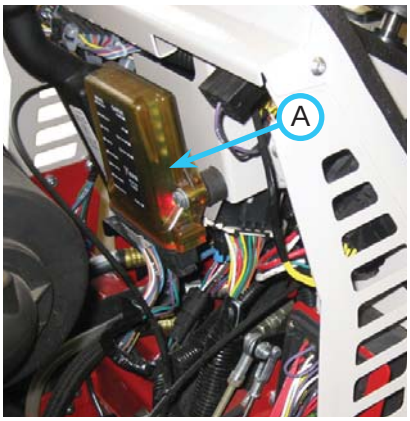
Attempting to start the disabled unit with the boosting vehicle's engine running could cause damage to the regulator.



A. Discharged Battery
B. Booster Battery
C. Ground Stud

5. Connect one end of the positive (+) booster cable to the discharged battery's positive (+) terminal (1).
6. Connect the other end of the positive (+) booster cable to the booster battery's positive (+) terminal (2).
7. Connect the negative (-) booster cable to the booster battery's negative (-) terminal (3).
8. Connect the other end of the negative (-) booster cable to the disabled power unit's ground stud (4).
9. Start the disabled power unit and remove the booster cables in reverse order of installation (negative booster cable first).

TCM (Tractor Control Module) Explanation



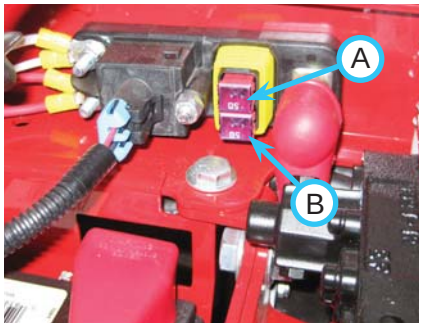
The Tractor Control Module (A) is a sealed computerized device designed to control the electronic safety related functions of this tractor. Both solid state and mechanical components are used to assure safe, reliable operation of this machine.

This TCM monitors the electronic circuits necessary for the engine, starter, and PTO to function. These "input" circuits include the PTO Switch, Neutral Switch, Parking Brake Switch, Key Switch, Seat Switch, and Generator Presence. The TCM is programmed to allow the engine, starter, or PTO to operate only when specific input criteria are satisfied. The engine, start, and PTO are controlled by "outputs" from the TCM.

For additional information, refer to the TCM section of the troubleshooting guide.

Replacing Fuses (Power Relay Module)

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Turn the battery disconnect switch to the Off position.
5. Tilt the seat forward and fasten in place with the seat prop.
6. Remove the sealed fuse cap from the power relay module.
7. Identify and pull the defective fuse from the socket.



Power Relay module (J-Case Fuse)		
Position	Fuse	Circuit
Top (A)	50 amp	Key Switch, TCM
Bottom (B)	50 amp	Rear Fuse Panel Supply

8. Insert a new fuse into the socket. Be certain to use the correct amperage fuse or damage may occur to the power unit.
9. Reinstall the sealed fuse cap and lower the seat back down to the operating position.
10. Turn the battery disconnect switch to the On position.

Replacing Fuses (Front Fuse Panel)

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Turn the battery disconnect switch to the Off position.
5. Remove the sealed cover (A) from the fuse panel.
6. Identify and pull the defective fuse from the socket.

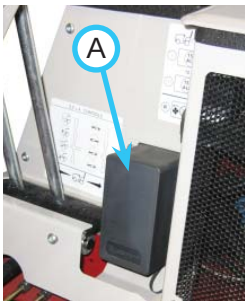
Front Fuse Panel (Mini Fuse)		
Position	Fuse	Circuit
1	15 amp	PTO
2	5 amp	Gauges
3	5 amp	Engine
4	15 amp	Lights
5	10 amp	Fuel Pump
6*	10 amp	Work/Strobe
7*	10 amp	Back-up / Horn / Directional
8	5 amp	Tractor Control Module 1
9^	10 amp	Diesel Stop
10	10 amp	Tractor Control Module 2

*Optional accessory.
^Diesel only.

7. Insert a new fuse into the socket. Be certain to use the correct amperage fuse or damage may occur to the power unit.
8. Reinstall the sealed cover onto the fuse panel.
9. Turn the battery disconnect switch to the On position.

Replacing Fuses (Rear Fuse Panel)

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.



4. Turn the battery disconnect switch to the Off position.
5. Tilt the seat forward and fasten in place with the seat prop.
6. Remove the sealed cover (A) from the fuse panel.
7. Identify and pull the defective fuse from the socket.

Rear Fuse Panel (Mini Fuse)		
Position	Fuse	Circuit
1*	25 amp (CB)	Spreader
2*	30 amp (CB)	Cab
3*	10 amp	Spreader Vibrator
4*	20 amp	12v Rear
5*	5 amp	Slope Indicator
6*	5 amp	12v Front 1
7*	15 amp	12v Front 2
8*	10 amp	Hyd. Aux
9	5 amp	Seat Switch Circuit
10	25 amp (CB)	Hydraulic Oil Cooler Fan

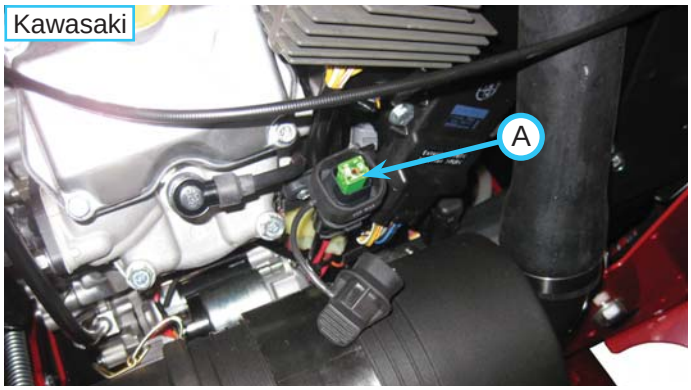
*Optional accessory.

8. Insert a new fuse into the socket. Be certain to use the correct amperage fuse or damage may occur to the power unit.
9. Reinstall the sealed cover onto the fuse panel and lower the seat back down to the operating position.
10. Turn the battery disconnect switch to the On position.

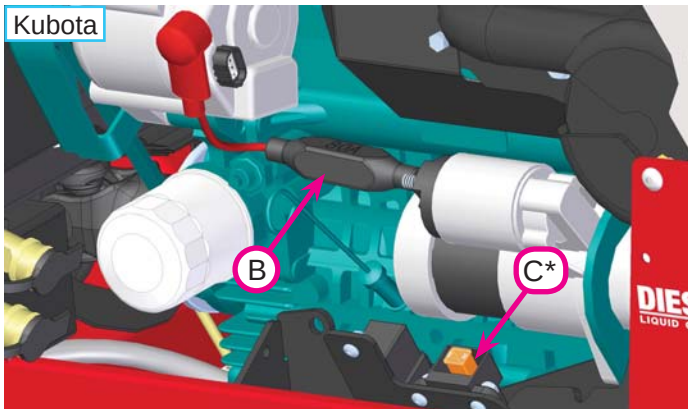
Replacing Fuses (Engine)

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch and allow the engine to cool.
4. Turn the battery disconnect switch to the Off position.
5. Open the engine hood to access the engine compartment.
6. **(Kubota fuse link)** Remove fuse link (B) from starter and alternator and install new fuse link.
7. **(Kawasaki & Kubota Diesel Fuses)** Locate the fuse holder (A or C) and pull up on the tab to remove the cover.

Kawasaki



Kubota



Engine Fuses		
Position	Fuse	Circuit
A	50 amp J-Case	Charge (Kawasaki)
B	80 amp fuse link	Charge (Kubota Gas & Diesel)
C	50 amp J-Case	Glow Plug (*Kubota Diesel only)

8. Pull the defective fuse from the socket.
9. Insert a new fuse into the socket. Be certain to use the correct amperage fuse or damage may occur to the power unit.
10. Reinstall the fuse cover.
11. Close the engine hood and turn the battery disconnect switch to the On position.

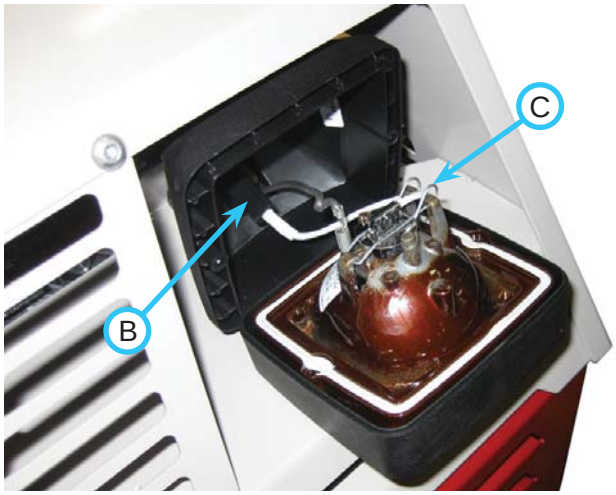
Replacing Light Bulbs (Headlights & Work Lights)

⚠ CAUTION

The light bulb contains gases under pressure. The bulb may shatter if the glass is scratched or dropped. Wear eye protection and handle bulb with care.

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Remove the two screws (A) from the light cover and remove the cover.

5. Disconnect the light bulb wire from the plug (B).



6. Pinch the wire spring fastener (C) and lift away from the light bulb.
7. Remove the defective light bulb.
8. Install the new light bulb and secure with the wire spring fastener.
9. Connect the light bulb wire to the plug.
10. Reinstall the light cover.

Replacing The Taillights

The taillights are equipped with LEDs and do not use a replaceable bulb. If a taillight no longer functions, the entire taillight must be replaced.

Replacing The Turn Signal Lights

The signal lights used for the turn signal / hazard flasher kit are equipped with LEDs and do not use a replaceable bulb. If a signal light no longer functions, the entire light must be replaced.

Replacing The Strobe Light Bulb

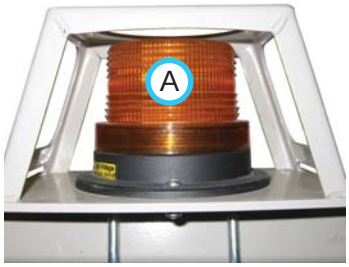
1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.

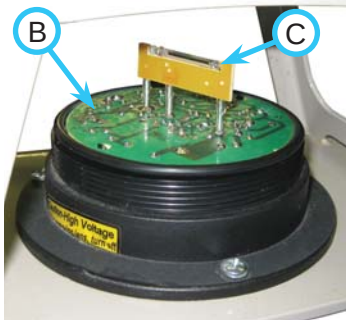
⚠ WARNING

High Voltage!

Before removing strobe light lens, turn off power and wait five minutes for the capacitor to discharge.

4. Turn the battery disconnect switch to the Off position and wait five minutes for the capacitor to discharge.
5. Unscrew the strobe lens (A) from the base.
6. Hold the circuit board (B) in place with one hand and remove the strobe bulb (C).
7. Install the new strobe bulb, pushing it securely onto the circuit board connectors.
8. Ensure the circuit board and the o-ring are in place and reinstall the strobe lens.
9. Turn the battery disconnect switch to the On position.





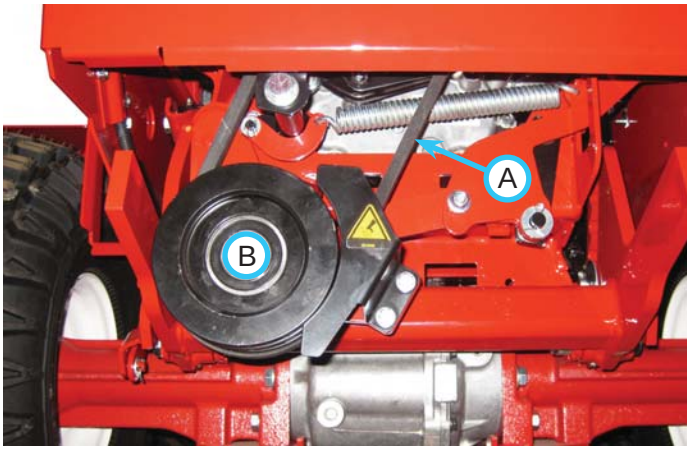
PTO Belt Inspection

⚠ WARNING

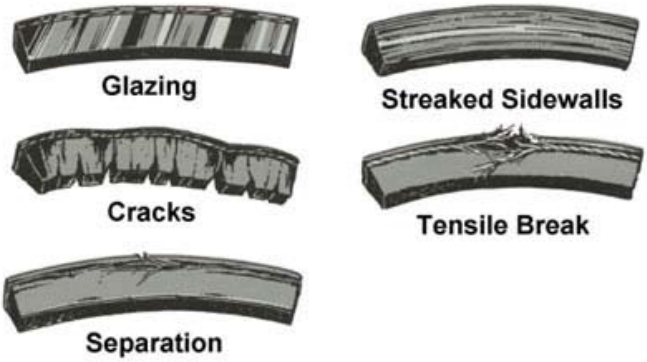
Always set the parking brake, shut off power unit engine, remove the ignition key, and ensure all moving parts have come to a complete stop before inspecting components or attempting any repair or adjustment.

Inspecting the PTO belt (A) of this power unit can prevent sudden belt failure by finding problems before they cause the belt to break. Inspect the PTO belt prior to operation, as part of the daily inspection or anytime a problem is suspected. There may be a PTO belt problem if there is a squealing or chattering sound, or the smell of a slipping belt.

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Check the PTO belt (A) at the PTO idle pulley (B).

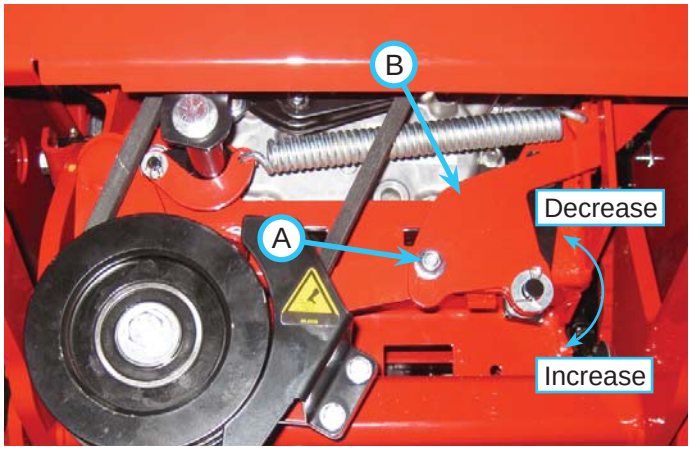


5. Typical wear on a drive belt may result in the conditions shown in the diagram. If any of these conditions occur, the drive belt will require replacement.



PTO Belt Tension Adjustment

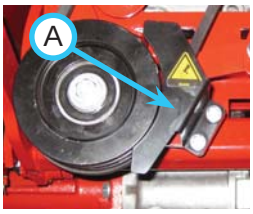
1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Pull out on the PTO belt tensioner rod to release tension on the belt tensioner linkage.
5. Loosen the adjustment bolt (A) and rotate the tension adjustment link (B) clockwise to increase the tension applied to the PTO and attachment belts. Rotate the tension adjustment link counterclockwise to decrease the tension applied to the PTO and attachment belts.



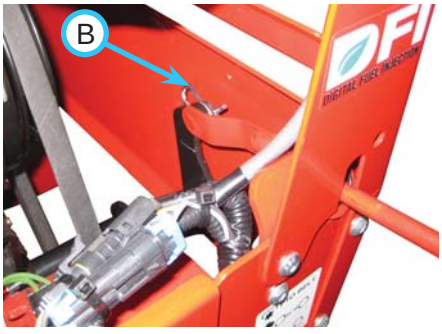
6. Tighten the adjustment bolt securely. Torque to 31 ft-lbs (42 Nm).

PTO Belt Replacement

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch and allow the engine to cool.



4. Open the engine hood.
5. Remove the PTO idler pulley guard (A).
6. Pull the PTO belt tensioner rod out to release the belt tension.



7. Remove the hairpin (B) and washer that fastens the belt tensioner rod to the belt tension rocker. NOTE: on Kubota models it may be easier to remove the hairpin from below, prior to releasing the PTO belt tensioner rod.
8. Remove the belt tension rod from the belt tension rocker.

9. Lift up on the PTO idler pulley and remove the belt from the pulley.
10. Pull the belt up between the PTO tension rocker and the front grill. If necessary, rotate the PTO tension rocker to increase the gap between the rocker and the grill.
11. Push the new belt down between the PTO tension rocker and the front grill.
12. Install the belt onto the clutch pulley.
13. Lift up on the PTO idler pulley and install the belt in the rear groove of the idler pulley.
14. Reinstall the PTO belt tensioner rod to the belt tension rocker and fasten with the hairpin and washer.
15. Reinstall the PTO idler pulley guard. Torque bolts to 100 in-lbs (11 Nm).
16. Close the engine hood.

Wheel Removal & Installation

Wheel Removal:

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Loosen the wheel lug nuts , but do not remove.

⚠ WARNING

If power unit is not adequately supported, the unit could accidentally fall and trap or crush a person or appendage, causing severe injury or death.

5. Lift up the corner of the power unit and secure with a jack stand.
6. Remove the lug nuts and lift the wheel off the mounting studs.

Wheel Installation:

1. Place the wheel onto the mounting studs with the hub side of the rim against the axle hub. NOTE: if the wheel is equipped with a single valve stem, the valve stem will be to the outside of the power unit. If the wheel is equipped with dual valve stems, there is a decal on the rim that specifies the hub side of the rim.
2. Install the lug nuts and tighten by hand until the wheel is held against the axle hub.
3. Lift the power unit up slightly and remove the

jack stand. Lower the power unit to the ground.

4. Tighten the wheel nuts in a crisscross sequence as shown. Torque to 55 ft-lbs (75 Nm).

Outer Dual Wheel Removal & Installation

1. Raise the power unit approximately 2 inches (5 cm) by driving the power unit onto wood planks positioned in line with the inner wheels. The outer wheels should not contact the wood planks.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Place wheel chocks in front and back of the inner wheels to prevent accidental movement.

⚠ WARNING

Place wheel chocks in front and back of the inner wheels to prevent the power unit from rolling during removal or installation of outer dual wheels.

A jack and jack stands may be used if planks are not available.

Outer Dual Wheel Removal:

1. Loosen the draw bolts approximately 5 turns.
2. With a medium size hammer, hit the end of the draw bolt until the draw cone releases.
3. Remove the dual wheel assemblies by rotating counter-clockwise.
4. Install the plastic plugs from the dual wheel kit into the inner dual wheel hubs on all four tires.
5. If desired, move the steering cylinder to the inner hole setting of the cylinder mount under the left front corner of the foot platform. Torque to 150 ft-lbs (203 Nm).

Outer Dual Wheel Installation:

1. Remove the plastic plugs from the inner dual wheel hubs.
2. Inspect the threaded end of the dual wheel extensions to ensure the draw cone, draw bolt, and the external threads of the dual wheel extension have a light coating of grease. Apply grease if necessary.
3. The draw cone must be loose before installing the dual wheel extension into the inner hub. Check by sliding the draw bolt in and out. It should have 1/4” to 1/2” of travel.
4. Insert the threaded end of the dual wheel extension into the inner dual wheel hub. Using both hands, turn the dual wheel assembly clockwise until the wheel is tight. Repeat for the other three wheels.
5. Tighten the draw bolt and torque to 120 ft-lbs (163 Nm). Repeat for the other three wheels.
6. If the steering cylinder is mounted to the inner hole setting of the steering cylinder mount, move the steering cylinder to the center hole setting of the steering cylinder mount under the left front corner of the foot platform. Torque to 150 ft-lbs (203 Nm).

Tire Pressure

Check the tire pressure prior to operation, as part of the daily inspection. Keep tires evenly inflated. Keep tire inflation within the proper range to prevent premature wear and/or poor traction.

Tire	Single Wheel	Dual Wheels	
		Inner	Outer
All Terrain	8-16 psi (55-110 kPa)	8-10 psi (55-69 kPa)	6-8 psi (41-55 kPa)
Bar	8-16 psi (55-110 kPa)	8-10 psi (55-69 kPa)	6-8 psi (41-55 kPa)
Turf	15-20 psi (103-138 kPa)	15-17 psi (103-117 kPa)	10-12 psi (69-83 kPa)

ROPS And Seat Belt Inspection

⚠ WARNING

Failure to inspect and maintain the Roll-Over Protection System and seat belt can lead to serious injury or death.

If any part of the ROPS experiences structural damage, the entire ROPS must be replaced.

Inspect the roll bar and seat belt prior to operation, as part of the daily inspection.

1. Inspect the roll bar for damage, missing components, and loose or missing hardware. Replace any damaged or missing components and tighten loose hardware prior to operating the power unit.
2. Inspect the seat belt webbing for cuts, abrasions, fraying, or excessive wear.
3. Inspect the seat belt webbing for damage from exposure to the sun's ultraviolet rays. If the original color of the webbing is extremely faded, the physical strength of the webbing may be deteriorated.
4. Inspect the seat belt webbing for dust and dirt. If the webbing is packed with dirt, the physical strength of the webbing may be deteriorated.
5. Inspect the seat belt webbing for stiffness. If the webbing is no longer flexible, the physical strength of the webbing may be deteriorated.
6. Inspect the seat belt buckle and latch for damage, cracks, or excessive wear.
7. Inspect the seat belt for proper operation. The seat belt should latch securely and release smoothly. Seat belt adjustment should be accomplished without excessive resistance.

If any problems are detected during this inspection, the component must be replaced prior to operating the power unit.

Parking Brake Inspection & Adjustment

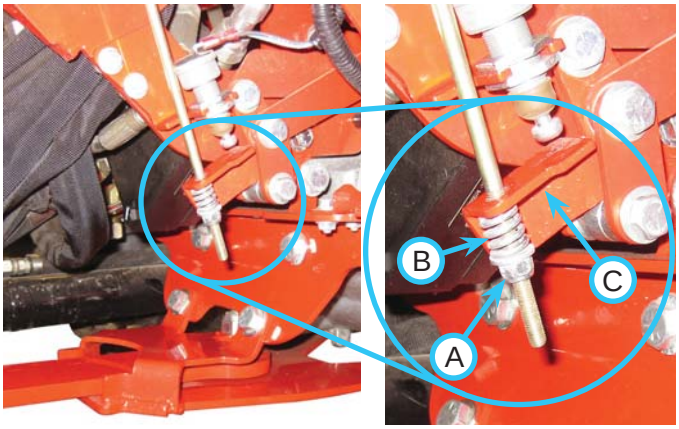
The parking brake tension must be set to require a minimum of 15 pounds (7 kg) of force to engage the brake lever 7 clicks or less from the off position. If less than 15 lbs (7 kg) of force is required to engage the brake lever 7 clicks or less from the off position, or if engaging the parking brake will not prevent the power unit from moving, the brake linkage rod will need to be adjusted.

1. Park the power unit on a level surface.
2. Shut off the engine and remove the key from the ignition switch.

⚠ WARNING

The parking brake must be disengaged as part of the adjustment procedure. Park the power unit on a level surface and place wheel chocks in front and back of wheels to prevent the power unit from rolling forward or backward.

3. Place wheel chocks in front and back of wheels to prevent power unit from rolling.
4. Disengage the parking brake to remove tension from the brake linkage.
5. Tighten the 1/4" lock nut (A) on the brake linkage rod several turns and recheck the amount of force required to engage the brake lever. Continue adjusting the 1/4" lock nut until there is a minimum of 15 lbs (7 kg) of force required to engage the brake lever 7 clicks or less from the off position.



6. After the required amount of force to engage the brake lever is achieved, disengage the parking brake and move the SDLA lever forward as far as it will go. While moving the SDLA lever forward, observe the compression spring (B) and brake engagement tab (C) on the brake linkage. The compression spring on the brake linkage rod should not cause the brake engage-

ment tab to be lifted up more than .03” (.8 mm). If the brake engagement tab moves more than that, it is possible for the brake to drag when travelling at full forward speed, causing premature wear of the brake.

7. If it is not possible to get the required 15 lbs (7 kg) of force to engage the brake lever 7 clicks or less from the off position without causing the brake engagement tab to move more than .03” (.8 mm) with the SDLA lever in the full forward position, the parking brake band may need further service. Contact your authorized Ventrac dealer for assistance.

Neutral Adjustment

The power unit should come to a complete stop with the neutral assist lever in the On position and the parking brake disengaged. The power unit should not attempt to move with the parking brake engaged. If the power unit is attempting to move, there will be an excessive amount of pump hydraulic noise, which indicates the pump is not in the neutral position.

If the power unit moves or attempts to move in either condition, the neutral position must be adjusted.

1. Remove any attachment from the power unit.
2. Park the power unit on a level surface.
3. Engage the parking brake and shut off the engine.
4. Remove the key from the ignition switch.
5. Remove the pump cover from the power unit.

⚠ WARNING

Do not attempt to adjust the neutral position with the power unit wheels on the ground. The power unit could accidentally move forward or backward, causing severe injury or death.

If power unit is not adequately supported, the unit could accidentally fall and trap or crush a person or appendage, causing severe injury or death.

6. Lift the power unit so all four wheels are a minimum of 2” (5 cm) off the ground and secure the power unit with jack stands or supporting blocks. Make sure the jack stands or supporting blocks will not make contact with the wheels when they rotate.
7. Place a weight of 50 lbs (22.5 kg) on the seat so the operator presence switch is activated.
8. Place the neutral assist lever in the On position to engage the neutral assist spring.
9. Start the power unit and adjust the engine speed to approximately 2,000 RPM.
10. Locate the neutral adjustment bolt (A) on the lower right side of the front frame (right column panel), directly below the neutral assist lever.

11. Loosen the acorn nut (A) slightly. NOTE: it is easier to attain the desired setting if the neutral adjustment bolt is left snug and a rubber mallet or a piece of wood and a metal hammer are used to tap the bolt in the desired direction. Do not strike the acorn nut directly with a metal hammer, as it is possible to dent or damage the nut.
12. Release the parking brake and observe which direction the tires are moving. If the tires are rotating in the forward direction, the neutral adjustment bolt should be moved up in the frame slot. If the tires are rotating in the reverse direction, the neutral adjustment bolt should be moved down in the frame slot.
13. Once the proper neutral position is found and the tires do not rotate any longer, tighten the neutral adjustment bolt to 31 ft-lbs (42 Nm). Make sure to hold the bolt head to help prevent the neutral adjustment bolt from moving in the slot when it is tightened.
14. Verify that the neutral position is still correct after tightening the bolt by moving the SDLA lever in the forward and reverse directions and allowing the spring return to move the lever back to the neutral position. Observe the tires to see if there is any movement. Repeat steps 11-13 as needed until there is no movement of the tires.
15. Engage the parking brake and listen for abnormal amounts of pump hydraulic noise. Repeat steps 11-13, if necessary.

⚠ WARNING

An improperly adjusted neutral switch can result in erratic engine cranking or unsafe power unit movement. Check the neutral switch position anytime an adjustment is made to the neutral position.

16. Adjustments made to the neutral adjustment

bolt may affect the neutral switch setting. After changing the neutral setting, it is possible that the power unit will not start, due to the neutral switch being out of adjustment. Refer to the neutral switch adjustment section for procedure on correctly setting the neutral switch position.

17. Engage the parking brake and shut off the engine.
18. Reinstall the pump cover onto the power unit.
19. Remove the weight from the power unit seat.
20. Remove the power unit from the jack stands or supporting blocks and return to the ground.

Neutral Switch Adjustment

⚠ WARNING

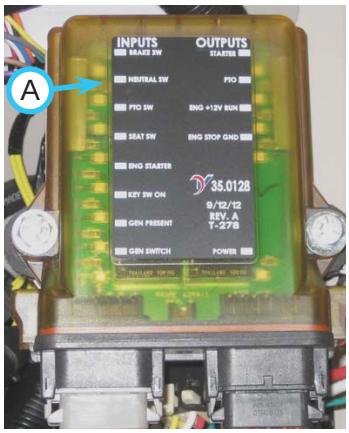
An improperly adjusted neutral switch can result in erratic engine cranking or unsafe power unit movement. Check the neutral switch position anytime an adjustment is made to the neutral position.

1. Park the power unit on a level surface.
2. Engage the parking brake and shut off the engine.
3. Remove the key from the ignition switch.
4. Remove the pump cover from the power unit.

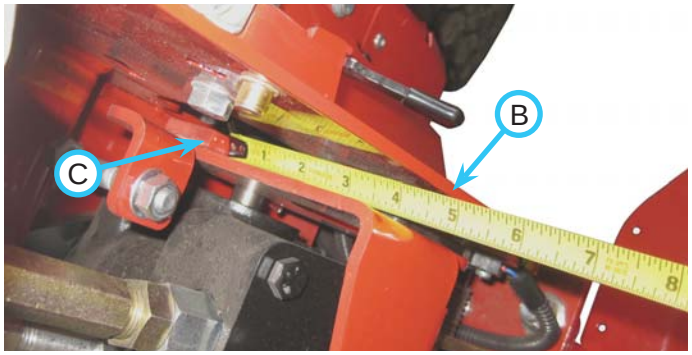
⚠ WARNING

The parking brake must be disengaged as part of the adjustment procedure. Park the power unit on a level surface and place wheel chocks in front and back of wheels to prevent the power unit from rolling forward or backward.

5. Place wheel chocks in front and back of wheels to prevent power unit from rolling.
6. Disengage the parking brake.
7. Turn the ignition key to the key switch's Run position to activate the electrical system, but do not start the engine.
8. Open the power unit's hood and locate the tractor control module (TCM) The neutral switch input light (A - 2nd light down from the top on the left side of the TCM) will be used as an indicator for when the neutral switch is on or off.



9. Measure the distance between the front frame (B) and the pump arm (C) and record for reference.



10. Move the SDLA lever slowly in the forward direction while watching the neutral switch input light. When the light goes out, stop the SDLA lever and measure the distance between the front frame and the pump arm. This measurement should be a minimum of 1/32" (.8 mm) less and a maximum of 1/16" (1.6 mm) less than the measurement taken in step 9 (ex. if measurement in step 9 was 4" (101.6 mm), the measurement when the light goes out must be between 3-31/32" (100.8 mm) and 3-15/16" (100 mm)). NOTE: it may be helpful to have an assistant to take the measurements.
11. If the measurement is not within the specified range, adjust the neutral switch mount (D) by loosening the two mounting bolts and sliding the mount in the necessary direction. Tighten the switch mount hardware to 100 in-lbs (11 Nm).

12. Repeat steps 10 and 11 as needed until the measurement is within the specified range.
13. Turn off the key switch and close the engine hood.
14. Engage the parking brake.
15. Reinstall the pump cover onto the power unit.
16. Remove the wheel chocks.
17. If you are unsure of the correct procedure to adjust the neutral switch, or if you are unable to attain the correct setting, contact your authorized Ventrac dealer for assistance.

Storage

Preparing the Power Unit for Storage

1. Clean the power unit.

Attention

To maintain the finish of the power unit and attachment, thoroughly wash the equipment to remove any corrosive agents (e.g., salt). Failure to clean the equipment may result in corrosion of (including but not limited to) steel, aluminum, and electrical components.

2. Inspect for loose or missing hardware, damaged components, or signs of wear.
3. Inspect the ROPS structure and seat belt for damage or signs of wear..
4. Inspect safety decals. Replace any safety decals that are faded, illegible, or missing.
5. Inspect hydraulic hoses for leaks and/or wear. Service as required.
6. Inspect hydraulic hoses, hydraulic fittings, and fuel lines to ensure tight, leak free connections.
7. Ensure parking brake tension is properly adjusted.
8. Inspect electrical system and connections.
9. Test the operator safety interlock system.
10. Perform a TCM (tractor control module) check to make sure the inputs and outputs are correct. Refer to the troubleshooting section for input and output information.
11. Inspect the PTO pulley and belt for damage or excessive wear. Service as required.
12. Inspect the electric PTO clutch air gap. Set gap to .020” (.5 mm).
13. Check the hydraulic oil level. Add fluid or service as required.
14. Check the coolant level (if equipped with a radiator) and make sure the temperature protection range is at least -34° F (-37° C). Add fluid or service as required.
15. Ensure the radiator screen (if equipped with a radiator), air cleaner, and engine compartment are clean.
16. Check tires for proper inflation.
17. Grease and lubricate all points specified in the maintenance section. Wipe off any excess grease or oil.

After all the above steps have been performed, complete the preparation for storage by performing the steps for either long term storage (4 months or longer) or short term storage (less than 4 months).

Long Term Storage (4 Months or Longer)

1. Change the engine oil to prevent damage that can be caused by acidic build up in used motor oil.
2. **(Gasoline engines only)** Drain all fuel out of the fuel tank, start the power unit, and allow to run until the engine stops to ensure all fuel is out of the fuel lines, carburetor passages, injectors, etc.
3. **(Diesel engine only)** Add a quality diesel fuel treatment to the fuel tank. Follow the manufacturer’s recommended mixing ratios. Start the power unit’s engine and run for 10 minutes to allow the fuel treatment to travel all through the fuel system.
4. Turn the key to the off position and remove.
5. Engage the parking brake.
6. Turn the fuel shut-off valve to the Off position.
7. Turn the battery disconnect to the Off position.
8. If the power unit is being stored in a cold climate (below 35° F (2° C)), remove the battery from the power unit and store in a warm location. Check the battery charge level periodically and charge the battery, if necessary.

Short Term Storage (Less than 4 Months)

1. Add a good quality fuel stabilizer (gasoline engines) or diesel fuel treatment (diesel engine) to the fuel tank. Follow the manufacturer’s recommended mixing ratios.
2. Start the power unit’s engine and run for 10 minutes to allow the fuel stabilizer to travel all through the fuel system.
3. Turn off the power unit engine and remove the key.
4. Engage the parking brake.
5. Turn the fuel shut-off valve to the Off position.
6. Turn the battery disconnect to the Off position.
7. Check the battery charge level periodically and charge the battery, if necessary.

Removing the Power Unit from Storage

1. Inspect, clean, and prepare the power unit for use. Perform all the steps in the daily inspection prior to use.

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4500K Maintenance Schedule

4500K - Vanguard Model 54 Air-Cooled

Maintenance Schedule	# of Locations	# of Pumps	AS NEEDED	After First 8 Hrs.	Daily	At 50 Hours	At 100 Hours	At 150 Hours	At 200 Hours	At 250 Hours	At 300 Hours	At 350 Hours	At 400 Hours	At 450 Hours	At 500 Hours	At 550 Hours	At 600 Hours	At 650 Hours	At 700 Hours	At 750 Hours	At 800 Hours	At 850 Hours	At 900 Hours	At 950 Hours	At 1000 Hours	Yearly	5 Years or 2000 Hrs.
Grease & Lubrication: See Lubrication Section																											
Front Hitch	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Lift Cylinder	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Center Pivot	1	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Steering Cylinder	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Drive-Shaft	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
3 Pt Cylinder @	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
3 Pt Pivot @	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Lower Connector Link	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Seat Slide	2	#	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Engine!																											
Check Engine Oil Level					✓																						
Change Engine Oil & Filter !				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Clean/Replace Spark Plugs (Gasoline Engines)	Consult Engine Owner's Manual; Follow Service Intervals for Heavy Loads and High Temperatures*																										
Inspect Primary Air Filter					✓																						
Replace Primary Air Filter	**					**		✓		**		✓		**		✓		**		✓		**		✓			
Replace Safety Air Filter												✓								✓							
Service Engine: Remove Blower Housing Bulkhead. Inspect and Clean	**				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Service Engine: Remove Cylinder Head Covers and Clean Cylinder Heads	**													✓										✓	✓		
Clean Engine Compartment, Engine, and Engine Rotating Screen	**			✓																							
Replace Fuel Filter	✓										✓									✓							
Drain Water & Sediment from Fuel Tank	✓																								✓		
Hydraulic System																											
Check Hydraulic Oil Level				✓																							
Check Rear Transaxle Oil Level								✓					✓					✓					✓	✓	✓		
Change Hydraulic Filters																							✓		✓		
Change Hydraulic Oil and Rear Transaxle Oil																										✓	
Parking Brake																											
Parking Brake Inspection & Adjustment				✓																							
Electrical																											
Replace Light Bulbs	✓																										
Clean Battery Terminals & Compartment	✓																								✓		
Inspection																											
Inspect Operator Interlock System				✓																							
Inspect ROPS structure and seatbelt				✓																							
Inspect for Loose, Missing, or Worn Components				✓																							
Inspect Battery, Electrical Connections, and Lights				✓																							
Inspect Belts, Fuel Lines, and Hydraulic Lines				✓																							
Check Tire Pressure.				✓																							
Check Wheel Lug Nuts. Torque to 55 ft-lbs					✓	✓				✓				✓				✓				✓					
Check Steering Cylinder Bolts. Torque to 150 ft-lbs						✓		✓		✓		✓		✓		✓		✓		✓		✓		✓			
Check Front/Rear Connector Link Bolts. Torque to 150 ft-lbs						✓		✓		✓		✓		✓		✓		✓		✓		✓		✓			
Check Front Hitch Pivot Bolts. Torque to 150 ft-lbs						✓		✓		✓		✓		✓		✓		✓		✓		✓		✓			

* If heavy load, high temperature, or dusty condition service intervals are not specified, Ventrac recommends servicing more frequently at 1/2 the standard service interval.

** Operation in severe conditions may require more frequent service intervals.

! Consult Engine Owner's Manual for engine oil information and complete servicing information

@ Optional Equipment

^ Grease Until Fresh Grease is visible

Silicon Based Spray Lubricant

4500K Maintenance Checklist

4500K - Vanguard Model 54 Air-Cooled

Maintenance Checklist	# of Locations	# of Pumps	AS NEEDED	After First 8 Hrs.	Daily	At 50 Hours	At 100 Hours	At 150 Hours	At 200 Hours	At 250 Hours	At 300 Hours	At 350 Hours	At 400 Hours	At 450 Hours	At 500 Hours	At 550 Hours	At 600 Hours	At 650 Hours	At 700 Hours	At 750 Hours	At 800 Hours	At 850 Hours	At 900 Hours	At 950 Hours	At 1000 Hours	Yearly	5 Years or 2000 Hrs.
Grease & Lubrication: See Lubrication Section																											
Front Hitch	2	1			■		■		■		■		■		■		■		■		■		■		■		■
Lift Cylinder	2	1			■		■		■		■		■		■		■		■		■		■		■		■
Center Pivot	1	1			■		■		■		■		■		■		■		■		■		■		■		■
Steering Cylinder	2	1			■		■		■		■		■		■		■		■		■		■		■		■
Drive-Shaft	2	1			■		■		■		■		■		■		■		■		■		■		■		■
3 Pt Cylinder @	2	1			■		■		■		■		■		■		■		■		■		■		■		■
3 Pt Pivot @	2	1			■		■		■		■		■		■		■		■		■		■		■		■
Lower Connector Link	2	1			■		■		■		■		■		■		■		■		■		■		■		■
Seat Slide	2	#			■		■		■		■		■		■		■		■		■		■		■		■
Engine!																											
Check Engine Oil Level			■		■		■		■		■		■		■		■		■		■		■		■		■
Change Engine Oil & Filter !			■		■		■		■		■		■		■		■		■		■		■		■		■
Clean/Replace Spark Plugs (Gasoline Engines)			Consult Engine Owner's Manual; Follow Service Intervals for Heavy Loads and High Temperatures*																								
Inspect Primary Air Filter			■		■		■		■		■		■		■		■		■		■		■		■		■
Replace Primary Air Filter			■		■		■		■		■		■		■		■		■		■		■		■		■
Replace Safety Air Filter			■		■		■		■		■		■		■		■		■		■		■		■		■
Service Engine: Remove Blower Housing Bulkhead. Inspect and Clean			■		■		■		■		■		■		■		■		■		■		■		■		■
Service Engine: Remove Cylinder Head Covers and Clean Cylinder Heads			■		■		■		■		■		■		■		■		■		■		■		■		■
Clean Engine Compartment, Engine, and Engine Rotating Screen			■		■		■		■		■		■		■		■		■		■		■		■		■
Replace Fuel Filter			■		■		■		■		■		■		■		■		■		■		■		■		■
Drain Water & Sediment from Fuel Tank			■		■		■		■		■		■		■		■		■		■		■		■		■
Hydraulic System																											
Check Hydraulic Oil Level			■		■		■		■		■		■		■		■		■		■		■		■		■
Check Rear Transaxle Oil Level			■		■		■		■		■		■		■		■		■		■		■		■		■
Change Hydraulic Filters			■		■		■		■		■		■		■		■		■		■		■		■		■
Change Hydraulic Oil and Rear Transaxle Oil			■		■		■		■		■		■		■		■		■		■		■		■		■
Parking Brake																											
Parking Brake Inspection & Adjustment			■		■		■		■		■		■		■		■		■		■		■		■		■
Electrical																											
Replace Light Bulbs			■		■		■		■		■		■		■		■		■		■		■		■		■
Clean Battery Terminals & Compartment			■		■		■		■		■		■		■		■		■		■		■		■		■
Inspection																											
Inspect Operator Interlock System			■		■		■		■		■		■		■		■		■		■		■		■		■
Inspect ROPS structure and seatbelt			■		■		■		■		■		■		■		■		■		■		■		■		■
Inspect for Loose, Missing, or Worn Components			■		■		■		■		■		■		■		■		■		■		■		■		■
Inspect Battery, Electrical Connections, and Lights			■		■		■		■		■		■		■		■		■		■		■		■		■
Inspect Belts, Fuel Lines, and Hydraulic Lines			■		■		■		■		■		■		■		■		■		■		■		■		■
Check Tire Pressure.			■		■		■		■		■		■		■		■		■		■		■		■		■
Check Wheel Lug Nuts. Torque to 55 ft-lbs			■		■		■		■		■		■		■		■		■		■		■		■		■
Check Steering Cylinder Bolts. Torque to 150 ft-lbs			■		■		■		■		■		■		■		■		■		■		■		■		■
Check Front/Rear Connector Link Bolts. Torque to 150 ft-lbs			■		■		■		■		■		■		■		■		■		■		■		■		■
Check Front Hitch Pivot Bolts. Torque to 150 ft-lbs			■		■		■		■		■		■		■		■		■		■		■		■		■

* If heavy load, high temperature, or dusty condition service intervals are not specified, Ventrac recommends servicing more frequently at 1/2 the standard service interval.

** Operation in severe conditions may require more frequent service intervals.

! Consult Engine Owner's Manual for engine oil information and complete servicing information

@ Optional Equipment

^ Grease Until Fresh Grease is visible

Silicon Based Spray Lubricant

4500P Maintenance Schedule

4500P - Kawasaki FD851D

Maintenance Schedule	# of Locations	# of Pumps	AS NEEDED	After First 8 Hrs.	Daily	At 50 Hours	At 100 Hours	At 150 Hours	At 200 Hours	At 250 Hours	At 300 Hours	At 350 Hours	At 400 Hours	At 450 Hours	At 500 Hours	At 550 Hours	At 600 Hours	At 650 Hours	At 700 Hours	At 750 Hours	At 800 Hours	At 850 Hours	At 900 Hours	At 950 Hours	At 1000 Hours	Yearly	5 Years or 2000 Hrs.
Grease & Lubrication: See Lubrication Section																											
Front Hitch	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Lift Cylinder	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Center Pivot	1	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Steering Cylinder	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Drive-Shaft	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
3 Pt Cylinder @	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
3 Pt Pivot @	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Lower Connector Link	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Seat Slide	2	#	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Engine!																											
Check Engine Oil Level					✓																						
Change Engine Oil & Filter !				✓			✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		
Clean/Replace Spark Plugs (Gasoline Engines)	Consult Engine Owner's Manual; Follow Service Intervals for Heavy Loads and High Temperatures*																										
Inspect Primary Air Filter					✓																						
Replace Primary Air Filter	**				**		✓		**		✓		**		✓		**		✓		**		✓				
Replace Safety Air Filter											✓								✓								
Check Coolant Level					✓																						
Service Cooling System																									✓		
Clean Engine Compartment, Engine, & Radiator	**				✓																						
Replace Fuel Filter	✓										✓								✓								
Drain Water & Sediment from Fuel Tank	✓																								✓		
Hydraulic System																											
Check Hydraulic Oil Level					✓																						
Check Rear Transaxle Oil Level								✓					✓					✓					✓	✓			
Change Hydraulic Filters																							✓			✓	
Change Hydraulic Oil and Rear Transaxle Oil																										✓	
Parking Brake																											
Parking Brake Inspection & Adjustment					✓																						
Electrical																											
Replace Light Bulbs	✓																										
Clean Battery Terminals & Compartment	✓																								✓		
Inspection																											
Inspect Operator Interlock System					✓																						
Inspect ROPS structure and seatbelt					✓																						
Inspect for Loose, Missing, or Worn Components					✓																						
Inspect Battery, Electrical Connections, and Lights					✓																						
Inspect Belts, Fuel Lines, and Hydraulic Lines					✓																						
Check Tire Pressure.					✓																						
Check Wheel Lug Nuts. Torque to 55 ft-lbs				✓		✓				✓				✓				✓				✓					
Check Steering Cylinder Bolts. Torque to 150 ft-lbs						✓		✓		✓		✓		✓		✓		✓		✓		✓		✓			
Check Front/Rear Connector Link Bolts. Torque to 150 ft-lbs						✓		✓		✓		✓		✓		✓		✓		✓		✓		✓			
Check Front Hitch Pivot Bolts. Torque to 150 ft-lbs						✓		✓		✓		✓		✓		✓		✓		✓		✓		✓			

* If heavy load, high temperature, or dusty condition service intervals are not specified, Ventrac recommends servicing more frequently at 1/2 the standard service interval.

** Operation in severe conditions may require more frequent service intervals.

! Consult Engine Owner's Manual for engine oil information and complete servicing information

@ Optional Equipment

^ Grease Until Fresh Grease is visible

Silicon Based Spray Lubricant

4500P Maintenance Checklist

4500P - Kawasaki FD851D

Maintenance Checklist	# of Locations	# of Pumps	AS NEEDED	After First 8 Hrs.	Daily	At 50 Hours	At 100 Hours	At 150 Hours	At 200 Hours	At 250 Hours	At 300 Hours	At 350 Hours	At 400 Hours	At 450 Hours	At 500 Hours	At 550 Hours	At 600 Hours	At 650 Hours	At 700 Hours	At 750 Hours	At 800 Hours	At 850 Hours	At 900 Hours	At 950 Hours	At 1000 Hours	Yearly	5 Years or 2000 Hrs.
Grease & Lubrication: See Lubrication Section																											
Front Hitch	2	1			■		■		■		■		■		■		■		■		■		■		■		■
Lift Cylinder	2	1			■		■		■		■		■		■		■		■		■		■		■		■
Center Pivot	1	1			■		■		■		■		■		■		■		■		■		■		■		■
Steering Cylinder	2	1			■		■		■		■		■		■		■		■		■		■		■		■
Drive-Shaft	2	1			■		■		■		■		■		■		■		■		■		■		■		■
3 Pt Cylinder @	2	1			■		■		■		■		■		■		■		■		■		■		■		■
3 Pt Pivot @	2	1			■		■		■		■		■		■		■		■		■		■		■		■
Lower Connector Link	2	1			■		■		■		■		■		■		■		■		■		■		■		■
Seat Slide	2	#			■		■		■		■		■		■		■		■		■		■		■		■
Engine!																											
Check Engine Oil Level					■		■		■		■		■		■		■		■		■		■		■		■
Change Engine Oil & Filter !					■		■		■		■		■		■		■		■		■		■		■		■
Clean/Replace Spark Plugs (Gasoline Engines)	Consult Engine Owner's Manual; Follow Service Intervals for Heavy Loads and High Temperatures*																										
Inspect Primary Air Filter					■		■		■		■		■		■		■		■		■		■		■		■
Replace Primary Air Filter					■		■		■		■		■		■		■		■		■		■		■		■
Replace Safety Air Filter					■		■		■		■		■		■		■		■		■		■		■		■
Check Coolant Level					■		■		■		■		■		■		■		■		■		■		■		■
Service Cooling System					■		■		■		■		■		■		■		■		■		■		■		■
Clean Engine Compartment, Engine, & Radiator					■		■		■		■		■		■		■		■		■		■		■		■
Replace Fuel Filter					■		■		■		■		■		■		■		■		■		■		■		■
Drain Water & Sediment from Fuel Tank					■		■		■		■		■		■		■		■		■		■		■		■
Hydraulic System																											
Check Hydraulic Oil Level					■		■		■		■		■		■		■		■		■		■		■		■
Check Rear Transaxle Oil Level					■		■		■		■		■		■		■		■		■		■		■		■
Change Hydraulic Filters					■		■		■		■		■		■		■		■		■		■		■		■
Change Hydraulic Oil and Rear Transaxle Oil					■		■		■		■		■		■		■		■		■		■		■		■
Parking Brake																											
Parking Brake Inspection & Adjustment					■		■		■		■		■		■		■		■		■		■		■		■
Electrical																											
Replace Light Bulbs					■		■		■		■		■		■		■		■		■		■		■		■
Clean Battery Terminals & Compartment					■		■		■		■		■		■		■		■		■		■		■		■
Inspection																											
Inspect Operator Interlock System					■		■		■		■		■		■		■		■		■		■		■		■
Inspect ROPS structure and seatbelt					■		■		■		■		■		■		■		■		■		■		■		■
Inspect for Loose, Missing, or Worn Components					■		■		■		■		■		■		■		■		■		■		■		■
Inspect Battery, Electrical Connections, and Lights					■		■		■		■		■		■		■		■		■		■		■		■
Inspect Belts, Fuel Lines, and Hydraulic Lines					■		■		■		■		■		■		■		■		■		■		■		■
Check Tire Pressure.					■		■		■		■		■		■		■		■		■		■		■		■
Check Wheel Lug Nuts. Torque to 55 ft-lbs					■		■		■		■		■		■		■		■		■		■		■		■
Check Steering Cylinder Bolts. Torque to 150 ft-lbs					■		■		■		■		■		■		■		■		■		■		■		■
Check Front/Rear Connector Link Bolts. Torque to 150 ft-lbs					■		■		■		■		■		■		■		■		■		■		■		■
Check Front Hitch Pivot Bolts. Torque to 150 ft-lbs					■		■		■		■		■		■		■		■		■		■		■		■

* If heavy load, high temperature, or dusty condition service intervals are not specified, Ventrac recommends servicing more frequently at 1/2 the standard service interval.

** Operation in severe conditions may require more frequent service intervals.

! Consult Engine Owner's Manual for engine oil information and complete servicing information

@ Optional Equipment

^ Grease Until Fresh Grease is visible

Silicon Based Spray Lubricant

4500Z & 4500Y Maintenance Schedule

4500Z - Kubota WG972-GL; 4500Y - Kubota D902

Maintenance Schedule	# of Locations	# of Pumps	AS NEEDED	After First 50 Hrs.	Daily	At 50 Hours	At 100 Hours	At 150 Hours	At 200 Hours	At 250 Hours	At 300 Hours	At 350 Hours	At 400 Hours	At 450 Hours	At 500 Hours	At 550 Hours	At 600 Hours	At 650 Hours	At 700 Hours	At 750 Hours	At 800 Hours	At 850 Hours	At 900 Hours	At 950 Hours	At 1000 Hours	Yearly	5 Years or 2000 Hrs.
Grease & Lubrication: See Lubrication Section																										
Front Hitch	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Lift Cylinder	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Center Pivot	1	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Steering Cylinder	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Drive-Shaft	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
3 Pt Cylinder @	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
3 Pt Pivot @	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Lower Connector Link	2	1	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Seat Slide	2	#	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Engine!																										
Check Engine Oil Level					✓																					
Change Engine Oil & Filter !				✓			✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		
Clean/Replace Spark Plugs (Gasoline Engines)	Consult Engine Owner's Manual; Follow Service Intervals for Heavy Loads and High Temperatures*																									
Inspect Primary Air Filter					✓																					
Replace Primary Air Filter	**					**		✓		**		✓		**		✓		**		✓		**		✓		
Replace Safety Air Filter											✓									✓						
Check Coolant Level					✓																					
Service Cooling System																									✓	
Clean Engine Compartment, Engine, & Radiator	**				✓																					
Replace Fuel Filter (s)	✓										✓									✓						
Drain Water & Sediment from Fuel Tank	✓																								✓	
Hydraulic System																										
Check Hydraulic Oil Level					✓																					
Check Rear Transaxle Oil Level								✓					✓					✓					✓	✓		
Change Hydraulic Filters																							✓			✓
Change Hydraulic Oil and Rear Transaxle Oil																										✓
Parking Brake																										
Parking Brake Inspection & Adjustment					✓																					
Electrical																										
Replace Light Bulbs	✓																									
Clean Battery Terminals & Compartment	✓																								✓	
Inspection																										
Inspect Operator Interlock System					✓																					
Inspect ROPS structure and seatbelt					✓																					
Inspect for Loose, Missing, or Worn Components					✓																					
Inspect Battery, Electrical Connections, and Lights					✓																					
Inspect Belts, Fuel Lines, and Hydraulic Lines					✓																					
Check Tire Pressure.					✓																					
Check Wheel Lug Nuts. Torque to 55 ft-lbs				✓		✓				✓				✓				✓				✓				
Check Steering Cylinder Bolts. Torque to 150 ft-lbs						✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		
Check Front/Rear Connector Link Bolts. Torque to 150 ft-lbs						✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		
Check Front Hitch Pivot Bolts. Torque to 150 ft-lbs						✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		

* If heavy load, high temperature, or dusty condition service intervals are not specified, Ventrac recommends servicing more frequently at 1/2 the standard service interval.

** Operation in severe conditions may require more frequent service intervals.

! Consult Engine Owner's Manual for engine oil information and complete servicing information

@ Optional Equipment

^ Grease Until Fresh Grease is visible

Silicon Based Spray Lubricant

4500Z & 4500Y Maintenance Checklist

4500Z - Kubota WG972-GL; 4500Y - Kubota D902

Maintenance Checklist	# of Locations	# of Pumps	AS NEEDED	After First 50 Hrs.	Daily	At 50 Hours	At 100 Hours	At 150 Hours	At 200 Hours	At 250 Hours	At 300 Hours	At 350 Hours	At 400 Hours	At 450 Hours	At 500 Hours	At 550 Hours	At 600 Hours	At 650 Hours	At 700 Hours	At 750 Hours	At 800 Hours	At 850 Hours	At 900 Hours	At 950 Hours	At 1000 Hours	Yearly	5 Years or 2000 Hrs.
Grease & Lubrication: See Lubrication Section																											
Front Hitch	2	1																									
Lift Cylinder	2	1																									
Center Pivot	1	1																									
Steering Cylinder	2	1																									
Drive-Shaft	2	1																									
3 Pt Cylinder @	2	1																									
3 Pt Pivot @	2	1																									
Lower Connector Link	2	1																									
Seat Slide	2	#																									
Engine[!]																											
Check Engine Oil Level																											
Change Engine Oil & Filter [!]																											
Clean/Replace Spark Plugs (Gasoline Engines)	Consult Engine Owner's Manual; Follow Service Intervals for Heavy Loads and High Temperatures*																										
Inspect Primary Air Filter																											
Replace Primary Air Filter																											
Replace Safety Air Filter																											
Check Coolant Level																											
Service Cooling System																											
Clean Engine Compartment, Engine, & Radiator																											
Replace Fuel Filter																											
Drain Water & Sediment from Fuel Tank																											
Hydraulic System																											
Check Hydraulic Oil Level																											
Check Rear Transaxle Oil Level																											
Change Hydraulic Filters																											
Change Hydraulic Oil and Rear Transaxle Oil																											
Parking Brake																											
Parking Brake Inspection & Adjustment																											
Electrical																											
Replace Light Bulbs																											
Clean Battery Terminals & Compartment																											
Inspection																											
Inspect Operator Interlock System																											
Inspect ROPS structure and seatbelt																											
Inspect for Loose, Missing, or Worn Components																											
Inspect Battery, Electrical Connections, and Lights																											
Inspect Belts, Fuel Lines, and Hydraulic Lines																											
Check Tire Pressure.																											
Check Wheel Lug Nuts. Torque to 55 ft-lbs																											
Check Steering Cylinder Bolts. Torque to 150 ft-lbs																											
Check Front/Rear Connector Link Bolts. Torque to 150 ft-lbs																											
Check Front Hitch Pivot Bolts. Torque to 150 ft-lbs																											

* If heavy load, high temperature, or dusty condition service intervals are not specified, Ventrac recommends servicing more frequently at 1/2 the standard service interval.

** Operation in severe conditions may require more frequent service intervals.

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@ Optional Equipment

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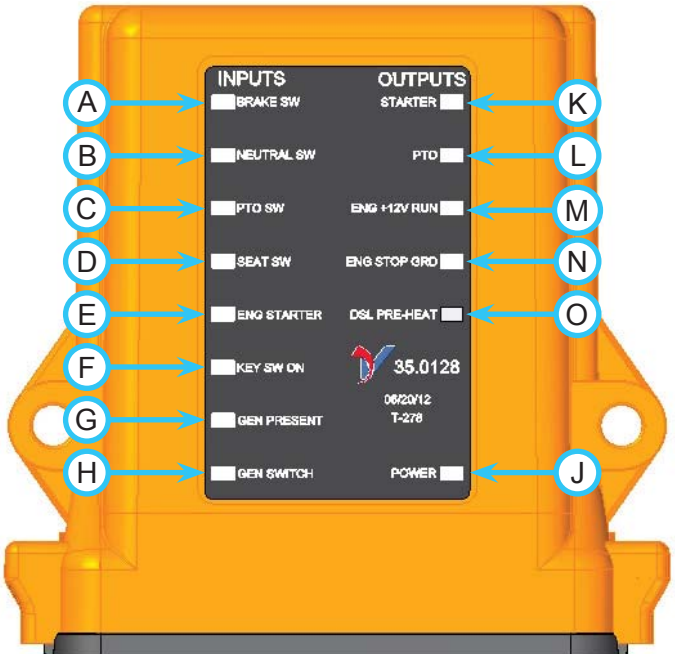
Silicon Based Spray Lubricant

Electrical Troubleshooting Using The Tractor Control Module (TCM)

The TCM monitors the electronic circuits necessary for the engine, starter, and PTO to function. These “input” circuits include the PTO Switch, Neutral Switch, Parking Brake Switch, Key Switch, Seat Switch, and Generator Presence. The TCM is programmed to allow the engine, starter, or PTO to operate only when specific input criteria are satisfied. The engine, start, and PTO circuits are controlled by “outputs” from the TCM.

For troubleshooting purposes, the TCM includes red LED lights for each circuit. The LED lights will activate when the input or output circuit is activated. The TCM is divided into two sections: the left (input) side displays the 8 inputs with red LED lights; the right (output) side displays the 5 outputs also with red LED lights. The TCM has two power supplies. The first supplies powers to the computer independent of the key switch so that the TCM does not turn on and off with each key switch on & off cycle. (Note: When the battery disconnect switch is turned to Off, the TCM is also turned off). The second supply energizes the rest of the computer when the key switch is turned on.



Input Circuits

Brake Switch (A)

The light indicates the circuit is closed and the parking brake is engaged. In order for this light to operate, the key switch must be in the On position.

Neutral Switch (B)

The light indicates the circuit is closed and the power unit’s forward/reverse control is in neutral. In order for this light to operate, the key switch must be in the On position and the forward/reverse control (SDLA) must be in the neutral position.

PTO Switch (C)

The light indicates the PTO switch is in the On position. In order for this light to operate, the key switch must be in the On position and the PTO switch must be in the On (engaged) position.

Seat Switch (D)

The light indicates that an operator is present in the seat. In order for this light to operate, the key switch must be in the On position and the operator must be present in the seat.

Engine Starter (E)

The light indicates that the key switch is turned to the Start position.

Key Switch On (F)

The light indicates that the key switch is turned to the On position. The key switch must be in the On position for the TCM to activate.

Generator Present (G)

The light indicates that the generator is connected to the power unit, which activates a specific set of criteria and allows the PTO to operate without an operator present on the seat. In order for this light to operate, the key switch must be in the On position and a generator must be connected to the power unit.

Generator Switch (H)

The light indicates that the switch on the generator is set to the On (engaged) position. In order for this light to operate, the key switch must be in the On position, a generator must be connected to the power unit, and the switch on the generator must be pulled up to the On (engaged) position.

Power (J)

This light is located at the bottom right corner of the TCM. This light indicates that there is full time power to the TCM and is only shut off by the battery disconnect switch. It keeps the TCM computer energized to eliminate the delay that would otherwise be present when the key switch is first turned to the On position.

Output Circuits

Specific input conditions must be satisfied before each output circuit can function.

Starter (K)

The light indicates that power is being sent to the starter solenoid. For the starter output to function, the parking brake must be set and the power unit’s forward/reverse control must be in neutral.

PTO (L)

The light indicates that power is being sent to the PTO clutch relay. For the PTO output to function, the operator must be on the seat.

If the PTO remote kit is installed and an attachment such as the generator is connected, the TCM will automatically enable the Remote PTO function. In this mode the PTO switch on the generator replaces the seat switch criteria for the PTO to function. The parking brake must be engaged for the Remote PTO to function.

The following engine commands are engine specific.

Engine +12V Run (M)

This output is specific for the engines on the 4500P, 4500Z, and 4500Y. This light indicates that power is being sent to the engine control module in order for the engine to run. For this light to operate, either the operator must be sitting on the seat, or the parking brake must be engaged and the forward/reverse control (SDLA) must be in the neutral position.

Engine Stop Ground (N)

This output is specific for the engine on the 4500K. In order for this engine to run, the engine stop ground must be open. To shut off this engine, the engine stop ground must be closed.

This light indicates the engine stop ground is open, allowing the engine to run.

Diesel Pre-Heat (O)

This output is specific for the diesel engine on the 4500Y. It controls the signal that activates and deactivates the glow plugs.

If there is an electrical issue, perform the Operator Safety Interlock Systems test as the first step in troubleshooting the system.

Perform the following safety interlock tests daily. Before testing, park the power unit on a level surface, place wheel chocks in front and back of wheels, and place the high/low range shift lever in the neutral position. After testing is complete, place the high/low shift lever in either high or low range, set the parking brake, and remove the wheel chocks.

Turn the ignition key to the run position. Tests 1 - 4 test the engine start function, tests 5 - 9 test the engine run function, and tests 10 - 13 test the PTO function.

	Test Number	Parking Brake Engaged	Forward/Reverse Control (SDLA) in Neutral	Operator Present in Seat	Engine Starts
Engine Start	1	No	Yes	Yes	No
	2	Yes	No	Yes	No
	3	Yes	Yes	No	Yes
	4	Yes	Yes	Yes	Yes
	Test Number	**Parking Brake Engaged**	**Forward/Reverse Control (SDLA) in Neutral**	**Operator Present in Seat**	**Engine Runs**
Engine Run	5	Yes	Yes	Yes	Yes
	6	Yes	Yes	No	Yes
	7	Yes	No	No	No
	8	Yes	No	Yes	No
	9	No	Yes	No	No
	Test Number	**PTO Switch**		**Operator Present in Seat**	**PTO Clutch**
PTO	10	Off		Yes	Off
	11	Pull to ‘On’ Position		No	No
	12	Pull to ‘On’ Position		Yes	Yes
	13	On		Raise Operator Body Weight from Seat	PTO Disengages (1/2 second delay)

Electrical Troubleshooting Guide

1. Always ensure that there is power supplied to the computer (TCM). With the key switch in the Off position, check to ensure the LED light for the Power input (J) is turned on. If the light is not on:
   a. Check the battery disconnect switch to ensure it is turned on.
   b. Check the 10 amp fuse in slot #10 of the front fuse panel. Replace this fuse, if necessary.
2. Turn the key switch to the On position and check to see if any of the other lights turn on. If no other lights turn on, check the 5 amp fuse in slot #8 of the front fuse panel. Replace this fuse, if necessary.
   If any other lights turn on, you can start troubleshooting the rest of the TCM functions.
3. To troubleshoot the circuits in the chart below, the corresponding LED lights must be 'On' for the circuit to function. If any of the required LED lights are not on, refer to the troubleshooting section in the following pages.

Circuit	Power	Brake Switch	Neutral Switch	PTO Switch	Seat Switch	Engine Starter	Key Switch	Generator Present	Generator Switch
Starter									
PTO									
PTO w/Generator									
Engine +12V Run w/o Operator									
Engine +12V Run w/Operator									
Engine Stop Ground									

TROUBLESHOOTING

Engine

Symptom:	Possible Cause:
Starter will not engage.	Battery disconnect switch in Off position. Blown fuse in power relay module. Blown fuse in start circuit. Parking brake is not engaged. Parking brake switch is out of adjustment. Power unit not in neutral. Neutral switch is out of adjustment. Low battery voltage.
Engine cranks, but won't start.	Fuel shut-off valve is turned off. Insufficient fuel level. Faulty fuel pump. Plugged fuel filters. Fuel tank vent not operating. Cold weather - cycle glow plugs a second time (diesel only). Glow plugs not working (diesel only). Obstruction in the fuel line. Fuel shut-off solenoid not working (diesel only). Faulty injector pump. Poor engine compression.
Engine runs rough.	Plugged or partially plugged air filters. Plugged or partially plugged fuel filters. Fuel tank vent not operating properly. Stale, dirty fuel OR wrong seasonal fuel mixture. Insufficient fuel level. Faulty spark plugs (gas only). Moisture in spark plug pockets (gas only). Incorrect choke setting (gas only). Faulty fuel pump. Dirty or faulty fuel injectors. Faulty injector pump. Incorrect valve clearance. Valve seat failure.
Engine low on power.	Plugged or partially plugged air filters. Plugged or partially plugged fuel filters. Dirty or faulty fuel injectors. Low cylinder compression. Dirty or faulty fuel injectors.

Engine (Continued)

Symptom:	Possible Cause:
Engine overheats.	Dirty radiator screen. Low coolant level. Debris in engine compartment. Defective radiator cap. Defective thermostat. Loose alternator fan belt. Blown head gasket.
Oil light comes on when running.	Low oil level. Faulty oil sender. Faulty or plugged oil pump.
Engine emits white smoke.	Low engine temperature. Faulty head gasket. Water in combustion chamber.
Excessive fuel consumption.	Plugged or restricted air filters or hose. Dirty or faulty fuel injectors. Dirty or faulty carburetor.
Engine uses excessive oil.	Check for leaks. Incorrect oil viscosity. Plugged or restricted air filters and or hose. Worn rings or cylinder walls. Worn or faulty valves.

Electrical

Anytime there is an electrical issue, first check to ensure the LED light for the Power input (bottom right corner) of the TCM is turned on when the key switch is in the Off position. If the light is not on, check the battery disconnect switch to ensure it is turned on, then check the 10 amp fuse in slot #10 of the front fuse panel.
Next, turn the key switch to the On position and check to see if any of the other lights turn on. If no other lights turn on, check the 5 amp fuse in slot #8 of the front fuse panel. If any other lights turn on, you can start troubleshooting the rest of the TCM functions.

Symptom:	Possible Cause:
Battery does not charge.	Loose or corroded connections. Broken or loose wire in charge system. Blown fuse or fuse link in charge system. Defective battery. Loose alternator belt. Defective regulator. Defective alternator.
Lights do not activate.	Blown fuse. Blown light bulb. Broken wire. Defective light switch.

Electrical (Continued)

Symptom:	Possible Cause:
Glow plugs do not activate.	Blown fuse. Broken wire. Faulty glow plugs.
PTO does not engage.	Blown fuse. Faulty seat switch. (Operator must be in seat). Park brake switch not set properly (PTO Remote Mode). Faulty PTO switch. PTO belt failure. Clutch air gap out of adjustment. Faulty clutch.
All TCM lights are on, even with key switch off. Engine will not crank.	Low battery voltage.

Hydraulic

Symptom:	Possible Cause:
Front attachment does not lift.	Hydraulic oil level is low. Excessive load on front lift. Plugged hydraulic oil suction filter. Faulty hydraulic cylinder. Pump charge pressure is low. Hardware missing on lift cylinder. Hardware missing on SDLA lever links.
Steering is difficult.	Hydraulic oil level is low. Plugged hydraulic oil suction filter. Faulty steering cylinder. Pump charge pressure is low. Excessive load on hydraulic system.
Excessive noise in hydraulic system.	Hydraulic oil level is low. Plugged hydraulic oil suction filter. Wrong oil used in hydraulic system. Cold weather - allow power unit to warm up.
Hydraulic system overheats	Tripped circuit breaker for hydraulic cooling fan. Dirty/plugged hydraulic cooler. Faulty cooling fan temperature sender. Faulty cooling fan. Overstressing the hydraulic system (using high range instead of low range for heavy work loads).

Power Unit

Symptom:	Possible Cause:
Power unit will not move with engine running.	High/low shift lever in the neutral position. Hydraulic oil level is low. Brake not releasing. Pump control arm connecting linkage loose or off. Tow valve bypassing at hydraulic pump. Universal joint at the engine/hydraulic pump is loose. Faulty hydraulic pump or motor.
Engine stalls whenever the SDLA control lever is moved forward or backward out of neutral.	Parking brake switch or neutral switch out of adjustment.

SPECIFICATIONS

Engine

Model	4500K	4500P	4500Z	4500Y
Manufacturer	Vanguard	Kawasaki	Kubota	Kubota
Model Number	543479	FD851D	WG972-GL	D902
Type	Gasoline	Gasoline	Gasoline^	Diesel
Cylinders	2	2	3	3
Displacement	896 cc	824 cc	962 cc	898 cc
Engine Gross HP	31	31	32	25
Operating Range (RPM)	1550-3650	1550-3600	1500-3650	1500-3650
Cooling System	Air Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled
Alternator	50 Amp	30 Amp	60 Amp	60 Amp

Electrical

Battery . . . . . 475 Cold Cranking Amps
Voltage . . . . . 12 Volts

Power Train

Type . . . . . Hydrostatic (All Wheel Drive)
Hydrostatic Transaxle (2) . . . . . Peerless
Fwd Speed (High)* . . . . . 10 mph (16.1 kph)
Fwd Speed (Low)* . . . . . 5.2 mph (8.4 kph)
Brakes . . . . . Hydro-Dynamic
Hydraulic Oil Filtration . . . . . 10 Micron & 25 Micron

Controls & instrument Panel

Steering . . . . . Power
PTO (Power Take Off) . . . . . Electric w/brake
Throttle Control . . . . . Cable
Directional Control . . . . . **S**peed, **D**irection, **L**ift, **A**uxiliary (S.D.L.A)
Control Orientation . . . . . Hand
Gauges . . . . . Tachometer, Volt, Water Temperature, Fuel, Speedometer
Parking/Emergency Brake . . . . . Band Brake

Other features

Turning Radius . . . . . 39” (99 cm)
Standard Tires . . . . . All Terrain (22 x 12-8) (56 x 30-20 cm)
Optional Tires . . . . . Turf (22 x 11-10) (56 x 28-26 cm)
Optional Tires . . . . . Bar (21 x 11-8) (53 x 28-20 cm)
Headlight . . . . . Halogen (55 watt)
Attachment System . . . . . Ventrac Mount

^ Propane, if equipped with optional kit.
* May vary based on tire size, type, and inflation.

SPECIFICATIONS

Dimensions

Wheelbase . . . . . 45” (114 cm)
Overall Length. . . . . 82” (208 cm)
Overall Height (top of ROPS bar) . . . . . 67” (170 cm)
Overall Width (single tires)*. . . . . 48” (122 cm)
Overall Width (dual tires)* . . . . . 73” (185 cm)
Weight** . . . . . 1,340-1,680 lbs. (610-760 kg)

Venture Products, Inc. reserves the right to change these specifications without notice.

* May vary based on tire size, type, and inflation.

** Weight varies based on engine size, tire options, and optional accessories.

Fluid Capacities

Ventrac 4500 Fluid Capacities				
	4500K Vanguard M54	**4500P** Kawasaki FD851D	**4500Z** Kubota WG972-GL	**4500Y** Kubota D902
Engine Oil*	2.4 quarts (2.3 liters)	2.0 quarts (1.9 liters)	3.0 quarts (2.8 liters)	3.9 quarts (3.7 liters)
Hydraulic Oil, Standard Power Unit*	12.0 quarts (11.4 liters)	12.0 quarts (11.4 liters)	12.0 quarts (11.4 liters)	12.0 quarts (11.4 liters)
Hydraulic Oil, Power Unit with 3 Point Hitch*	12.4 quarts (11.7 liters)	12.4 quarts (11.7 liters)	12.4 quarts (11.7 liters)	12.4 quarts (11.7 liters)
Hydraulic Oil, Rear Transaxle	4 quarts (3.8 liters)	4 quarts (3.8 liters)	4 quarts (3.8 liters)	4 quarts (3.8 liters)
Coolant (Antifreeze)	-	7 quarts (6.6 liters)	7 quarts (6.6 liters)	7 quarts (6.6 liters)
Fuel (Diesel or Unleaded Gasoline)	6 gallons (22.7 liters)	6 gallons (22.7 liters)	6 gallons (22.7 liters)	6 gallons (22.7 liters)
*When changing both oil and filter.				

Belt Chart

4500 Power Unit	Belt Size	Ventrac Part Number
4500 PTO Belt (Clutch to PTO Idler Pulley)	B38 belt	81.B038

Attachment Model	Belt Size	Ventrac Part Number
EA600 AERA-vator	B50 Belt	81.B050
ED200 Edger (with Blower)	B45 Belt	81.B045
ET200 Turbine Blower	B46 Belt	81.B046
HB580 Broom	B48 Belt	81.B048
HG150 Generator	B45 Belt	81.B045
HM602 Mower	B45 Belt	81.B045
HM722 Mower	B45 Belt	81.B045
HP722 Mower	B45 Belt	81.B045
HQ680 Tough Cut Mower	B45 Belt	81.B045
KA160 Power Blower	B51 Belt	81.B051
KC180 Stump Grinder	B53 Belt	81.B053
KH500 VERSA-Loader	B33 Belt	81.B033
KL480 Tiller	B66 Belt	81.B066
KP540 Power Rake	B48 Belt	81.B048
KX523 Snow Blower	B50 Belt	81.B050
KY400 Trencher	B53 Belt	81.B053
MC600 Rear Discharge Mower	B47 Belt	81.B047
MJ840 Contour Mower	B45 Belt	81.B045
MR740 Reel Mower	B47 Belt	81.B047

WARRANTY

LIMITED WARRANTY - VENTRAC TURF EQUIPMENT

Venture Products, Inc. (shall be referred to as V.P.I.) warrants on the terms and conditions herein, that it will repair, replace, or adjust any part manufactured by Venture Products Inc. and found by Venture Products Inc. to be defective in material and / or workmanship.

Effective September 1st 2005, Ventrac warranty on power units & attachments (excluding the HG100/HG150 generator) for **residential use only** is limited to **three (3) years** from original purchase date. Ventrac power units & attachments used **commercially or for any income-producing purpose** is limited to **two (2) years** from original purchase date. Ventrac ET200 turbine blower (turbine only) is limited to **two (2) years** from original purchase date. Ventrac HG100/HG150 generator is limited to **one (1) year** from original purchase date. Ventrac power units & attachments used for **rental** is limited to **180 days** from original purchase date. (**NOTE:** All accessories such as: 3-point hitch, foot pedal, dual wheel kit, etc. will be covered under the above warranty periods as they would apply provided they are installed by an authorized Ventrac dealer.) This warranty may be transferred and will carry the remainder of the warranty starting from the original purchase/registration date with the dealership and/or V.P.I. In the event that product/s originally registered as **(3) year residential use** are to be transferred to a commercial user, the warranty would change to the remainder of **(2) year commercial use** starting from the original purchase/registration date with the dealership and/or V.P.I.

If this warranty covers a consumer product as defined by the Magnusson-Moss warranty act, no warranties, express or implied, (including, but not limited to, the warranty of merchantability or fitness for a particular purpose) shall extend beyond the applicable time period stated in bold face type above.

If this warranty covers a product used commercially or for any income producing purpose, the foregoing warranties are in lieu of all other warranties and no representations, guarantees or warranties, express or implied, (including, but not limited to, a warranty of merchantability or fitness for a particular purpose), are made by V.P.I. in connection with the manufacture or sale of its products.

The engine warranty is covered by its respective engine manufacturer. Please refer to the engine manufacturer's warranty statement that is included in the owner's manual.

The Ventrac turf equipment, including any defective parts, must be returned to an authorized Ventrac dealer within the warranty period. The warranty shall extend to the cost to repair or replace (as determined by V.P.I.) the defective part. **The expense of pickup and delivery of equipment, service call drive time or any transportation expense incurred for warranty repair is the sole responsibility of the owner and is not covered under warranty by Ventrac and/or V.P.I.** V.P.I.'s responsibility in respect to claims is limited to making the required repairs or replacements, and no claim of breach of warranty shall be cause for cancellation or rescission of the contract of sale of any Ventrac equipment. Proof of purchase may be required by the dealer to substantiate any warranty claim. Only warranty work performed and submitted by an authorized Ventrac dealer may be eligible for warranty credit.

This warranty extends only to Ventrac turf equipment operated under normal conditions and properly serviced and maintained. The warranty expressly does **not** cover: (a) any defects, damage or deterioration due to normal use, wear and tear, or exposure; (b) normal maintenance services, such as cleaning, lubrication, oil change; (c) replacement of service items, such as oil, lubricants, spark plugs, belts, rubber hoses or other items subject to normal service replacement; (d) damage or defects arising out of, or relating to abuse, misuse, neglect, alteration, negligence or accident; (e) repair or replacement arising from operation of, or use of the turf equipment which is not in accordance with operating instructions as specified in the operator's manual or other operational instructions provided by V.P.I.; (f) repair or replacement arising as a result of any operation from Ventrac turf equipment that has been altered or modified so as to, in the determination of V.P.I., adversely affect the operation, performance or durability of the equipment

LIMITED WARRANTY - VENTRAC TURF EQUIPMENT

or that has altered, modified or affected the turf equipment so as to change the intended use of the product; (g) repair or replacement necessitated by the use of parts, accessories or supplies, including gasoline, oil or lubricants, incompatible with the turf equipment or other than as recommended in the operator's manual or other operational instructions provided by V.P.I.; (h) repairs or replacements resulting from parts or accessories which have adversely affected the operation, performance or durability of the turf equipment; or (i) damage or defects due to or arising out of repair of Ventrac turf equipment by person or persons other than an authorized Ventrac service dealer or the installation of parts other than genuine Ventrac parts or Ventrac recommended parts.

The sole liability of V.P.I. with respect to this warranty shall be repair and replacement as set forth herein. V.P.I. shall have no liability for any other cost, loss, or damage. In particular V.P.I shall have no liability or responsibility for: (i) expenses relating to gasoline, oil, lubricants; (ii) loss, cost, or expense relating to transportation or delivery of turf equipment from the location of owner or location where used by owner to or from any authorized Ventrac dealer; (iii) travel time, overtime, after hours time or other extraordinary repair charges or charge relating to repairs or replacements outside of normal business hours at the place of business of an authorized Ventrac dealer; (iv) rental of like or similar replacement equipment during the period of any warranty repair or replacement work; (v) any telephone or telegram charges; (vi) loss or damage to person or property other than that covered by the terms of this warranty; (vii) any claims for lost revenue, lost profit or additional cost or expense incurred as a result of a claim of breach of warranty; or (viii) attorney's fees.

The remedies of buyer set forth herein are exclusive and are in lieu of all other remedies. The liability of V.P.I., whether in contract, tort, under any warranty, or otherwise, shall not extend beyond its obligation as set forth herein. V.P.I. shall not be liable for cost of removal or installation nor shall V.P.I. be responsible for any direct, indirect, special or consequential damages of any nature. In no event shall V.P.I. be liable for any sum in excess of the price received for the goods for which liability is claimed.

There are no representations or warranties which have been authorized to the buyer of the turf equipment other than set forth in this warranty. Any and all statements or representations made by any seller of this equipment, including those set forth in any sales literature or made orally by any sales representative, are superseded by the terms of this warranty. Any affirmation of fact or promise made by V.P.I. or any of its representatives to the buyer which relates to the goods that are the subject to this warranty shall not be regarded as part of the basis of the bargain and shall not be deemed to create any express warranty that such goods shall conform to the affirmation or promise.

No employee, distributor, or representative is authorized to change the foregoing warranties in any way or grant any other warranty on behalf of V.P.I.

Some states do not allow limitations on how long an implied warranty lasts or allow the exclusion on limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

This warranty applies to all Ventrac turf equipment sold in the United States and Canada.